AMERICAN Railroad Journal

·ESTABLISHED·1831·

Railroads, Tramways, Finance, New Inventions, Machinery.

WHOLE NO. 2,545.] NEW YORK, OCTOBER, 1883. [VOLUME LVII.—No. 7.

Railroad Notes.

WE invite railroad officers to send us notice of elections, transfers, appointments, resignations, etc.; and all our readers would oblige us by furnishing us with any items of news which may come to their knowledge and are of a suitable nature for our columns. It is our intention to publish monthly full and accurate information regarding those enterprises and industries to which the AMERICAN RAILROAD JOURNAL is devoted, and to effect this end we solicit the coöperation of readers interested therein. We aim specially to record all new railway enterprises in the United States and Canada, and to note the progress of construction on all new roads and extensions; and we request those concerned in railway building to give us early information concerning the above, that our reports may be as complete as possible.

L. S. DANIEL has succeeded W. H. Munro, as trainmaster and station agent at Victoria, Texas, on the New York, Texas and Mexican Railway.

THE earnings of the Chicago and Grand Trunk Railway for the week ending September 29, show an increase of $14,795 over the corresponding week last year, and an aggregate increase in thirty-nine weeks of $577,090.

NEW CASTLE AND NORTHERN RAILWAY.—It is understood that the contract for the completion of the New Castle and Northern Railway, a part of the Erie system, is concluded. The road will connect with twenty-one furnaces, and is regarded as a valuable piece of railroad. The grading is more than half completed, and the entire line will be finished and in operation in about three months. Pittsburgh will then have another connection with the lakes.

THE Pennsylvania Railroad reports that the quantity of coal and coke carried over its lines for the week ending September 29, was 251,803 tons, of which 194,405 tons were coal and 57,398 tons coke. Of this weekly tonnage 181,262 tons originated on the main line of the Pennsylvania Railroad, while the remainder originated on its branch lines. The total tonnage for the year thus far has been 8,881,364 tons, of which 6,568,011 tons were coal and 2,313,353 coke. These figures embrace all the coal and coke carried over the road, east and west.

A NEW ROUTE TO THE PACIFIC COAST.—Captain C. W. Rogers, vice-president and general manager of the St. Louis and San Francisco Railroad, who has just returned from the Pacific coast, announces that arrangements are completed to open the Atlantic and Pacific road from Albuquerque to Colorado river on the 21st inst. From that date, through Pullman sleepers will be run from St. Louis to San Francisco over the St. Louis and San Francisco line to Halstead, Kan., thence over the Atchison, Topeka and Santa Fé to Albuquerque, then over the Atlantic and Pacific to the Needles on the Colorado river, thence to San Francisco by the Southern Pacific. Through sleepers will also be run from Kansas City by the Atchison, Topeka and Santa Fé to Albuquerque, thence by the Atlantic and Pacific and Southern Pacific to San Francisco. Through sleepers will also leave San Francisco at the same time and come East over the same routes. The distance from St. Louis to San Francisco by this new route is 2,440, or 250 miles shorter than that via Deming, and will be run in twelve hours' quicker time. The entire line is in first-class order, and is expected to become very popular, especially in the winter, on account of the mild temperature of the country through which it passes.

DENTON, MD., Oct. 15.—D. C. Hudson and Charles Powell will to-day resume the survey of the proposed route of the Maryland and Atlantic Railroad, beginning at Denton on the west side of the Choptank, and if possible make a direct line to Queenstown, touching at Hillsboro. The running of the line was postponed by the surveyors in July last, owing to the difficulty in crossing fields of growing corn. The entire route from Lewes to Kent Island will cross but one stream at a navigable point and that is the Choptank at Denton. Tuckahoe creek, which is the next largest stream to be spanned, will be bridged above navigation. Chief Engineer Mapes is expected in Denton to-day on business in connection with the survey.—*Every Evening*, Wilmington.

THE first public experiment on an extended scale in America of an electric locomotive will be tried on November 10. Vice-President Arkell, of the Saratoga and Mount Magregor Railroad, will try to run a train of two cars from Saratoga to Mount Magregor on that day with a daft motor.

THE Michigan Central Railroad Company, which at first voted against the adoption of the uniform time schedule adopted by the railroads of the country, has signified its intention to conform to the new rule.

OCTOBER 23.—American Association of Railroad Superintendents will be held at Washington, D. C., October 23.

THE twentieth annual convention of the International Brotherhood of Locomotive Engineers of the United States and Canadas was opened in Buffalo, N. Y., on the 17th inst. with a large attendance. Mayor Manning, in welcoming the convention, declared that the engineers of the commonwealth form no small part of the progress of the nation's life. Mr. Arthur, Grand Chief Engineer of the order, delivered the annual address, in which he recited the advantages of the order. On the subject of strikes he said the best method to settle the difficulties that arise between the employer and the employé is for the representatives of both sides to come together and talk them over in a friendly spirit, each one making concessions, whenever the nature of the case would seem to warrant it. This has always been the policy of the brotherhood, and they have never failed in effecting a satisfactory adjustment of the differences when met by the officers.

THE Southern Time Convention was held at No. 46 Bond street, New York, on the 17th inst. R. R. Bridgers, the president of the Wilmington and Weldon and the Wilmington, Columbia and Augusta Railroads, was in the chair. Thirty-four roads were represented. The new standard system of time devised by Mr. F. W. Allen was adopted on the motion of Major E. T. D. Myers, of the Richmond, Fredericksburg and Potomac Railroad. It was determined that the next schedules of the roads should go into effect Nov. 28, when the time system is to be generally adopted by the railroads throughout the country. A committee was appointed to arrange for the transmission of the time, consisting of W. F. Allen, chairman; H. S. Haines, of the Charleston and Savannah Road; John F. O'Brien, of the East Tennessee, Virginia and Georgia; F. Walcott Jackson, of the Pennsylvania Railroad's lines in New Jersey, and W. M. Clement, of the Baltimore and Ohio.

THE contest at Cincinnati over the election of three directors of the Ohio and Mississippi Railroad has terminated by a compromise, the directors elected being Robert Garrett, Edwards Whittaker and James H. Smith. This is the ticket which the Baltimore and Ohio interest in the beginning claimed had been agreed on by the London committee of shareholders.

THE last spike of the Kansas City, Springfield and Memphis Railroad, connecting Kansas City and Memphis, was driven on the 14th.

THE Commissioner of Railroads has made his report for the fiscal year ended June 30th, 1883, to the Secretary of the Interior. He reports that the properties of the several railroads within the jurisdiction of the Bureau are well maintained, and that while traffic is steadily increasing in volume the rates charged are gradually decreasing.

A SPECIAL cable dispatch from London to the Toronto *Globe* says: "The Grand Trunk railway report, issued on the 16th inst., shows a net revenue balance for the half year of £201,000. The payment of the full guarantee dividend on Great Western shares leaves a debit balance of £43,000 for adjustment at the end of the year. As compared with last year, the gross receipts of the past six months show an increase of nearly 10 per cent. The percentage of working expenses to receipts is about 2½ per cent. lower, while the net receipts show an increase of 19 per cent.

THE stockholders of the Nashville and Decatur railroad held their annual meeting on the 17th inst. Pres. Sloss submitted a report showing that the road was in a flourishing condition, and that the property of the company was continually increasing in value under the management of the lessees, the Louisville and Nashville Railroad Company. The old Board of Directors was reëlected. They held a meeting and reëlected J. W. Sloss, President, and George W. Seay, Secretary.

THE Pennsylvania Railroad Company has been petitioned to extend its tracks from Hentonville to Haddington.

ALL the stone quarries in Eastern Pennsylvania and New Jersey are being worked extensively for stone to be used on the Schuylkill Valley Railroad.

THE first through sleeping car to St. Louis via the Atlantic and Pacific and the St. Louis and San Francisco roads, will leave San Francisco on Saturday morning, Oct. 20.

OFFICERS of the Philadelphia and Reading Coal and Iron Company stated yesterday, in answer to questions about the reported demoralization in the coal trade, that their company had experienced no trouble.

THE Wabash Railroad Company has opened a freight line to the seaboard to be known as the "Wabash Eastern Short Line." It runs over the Baltimore and Ohio railroad to the junction with its main road and then over the main line and its connections to Detroit and the East.

THE bark Payson Tucker, Captain Tucker, sailed on 17th inst. from Philadelphia for Gibari and Matanzas, Cuba, with a cargo of platform cars and an iron railway bridge. The parts of the machinery are boxed, and will be put together on the bark's arrival at her destination by Philadelphia mechanics.

THE railroad machine shops, to be established at Birmingham, Miss., will in no way affect the shops at Meridian. The former are for the Alabama Great Southern, while the latter are for the New Orleans and Northeastern.

THE claim of the United States against the Central Pacific Railway Company, which has been pending for some time in the courts of California, for a large amount of internal revenue taxes; has been compromised. The terms of the compromise are that the railway company shall pay to the Government $69,000 and costs of the pending suit, and relinquish its claim against the Government for $26,818 on account of interest alleged to have been unlawfully paid on January 1, 1872.

AT the annual meeting of the stockholders of the Columbus, Springfield and Cincinnati Railroad Company, held at Columbus, Ohio, on the 18th inst., the following directors were elected: J. S. Farlow, N. W. Pierce, and J. D. Farnsworth, of Boston; J. A. Jeffrey, of Columbus; J. H. Thomas, of Springfield; J. L. Moore and J. D. Chamberlain, of Sandusky. The directors organized, electing J. S. Farlow president, J. D. Farnsworth, vice president, J. L. Moore secretary and treasurer, and O. P. Sampson assistant treasurer.

THE first through freight train on the Kansas City, Springfield and Memphis Road left Kansas City on the 17th inst. It consisted of 35 cars of meat, 5 of lard, 10 of grain, 2 of whisky, and 1 of fertilizers, 53 in all, and all from local consignors. The train was in two sections, and gaily decorated.

BUFFALO, N. Y., Oct. 18.—The Lehigh Valley Railroad Company is beginning to push things in Buffalo. It has just let to J. E. McIntire a contract for building 4,000 feet of double track trestle on its Scott street line, the work to be done and ready for the iron this fall. The company some time ago bought the Tifft farm, which lies near the harbor, in order to cut it into canals to increase the wharf facilities. It has now let to Mr. McIntire a contract for building eight miles of wharves on these canals. The work will require driving 65,000 piles.

THE people of Goliad, Tex., are trying to get a tap road to connect at Cuero. Huntington has agreed to construct the road for a bonus of $2,000 per mile. Nearly all of the required amount has already been pledged, and work will doubtless commence in a short time.

AT the annual meeting of the Pullman Palace Car Company; held at Chicago recently, George M. Pullman, Charles G. Hammond, John Creerar, Marshall Field, J. W. Doane, and Norman Williams, of Chicago, and Henry C. Hulbert, of New York, retiring directors, were re-elected. The statement for the year ending July 31, 1883, shows revenues of $4,093,245, of which $2,946,277 were earnings, $605,595 earnings of other associations operated by the company, $23,028 for patent royalties, $505,227 from manufacturing royalties, etc. The disbursements were $3,039,032, of which $976,380 were for operating expenses, $217,633 maintenance of upholstery and bedding, $175,702 proportion of operating expenses in other associations, $264,000 rental of leased lines, $171,074 interest on bonds, and $1,235,142 on dividends. The surplus for the year is $1,053,313. The assets are placed at $23,095,368, of which $9,858,049 is for cars and equipments, including assets, and $6,050,204 for the plant at the town of Pullman. The liabilities are $23,095,368. President Pullman, in his address, stated that during the year new contracts were made covering over 10,000 miles of railway, and renewals of old contracts covering over 7,000 miles. These contracts, he stated, required 121 additional cars, and means would have to be provided for the payment thereof. In accordance with this recommendation, the directors were authorized to issue the necessary 20 per cent. of new stock. Subsequently the board ef directors met and decided to issue 10 per cent. of new stock, amounting to $1,320,000, to provide for the new cars, payable Dec. 1. A quarterly dividend of 2 per cent. was declared, and also an extra dividend of 1½ per cent. out of the manufacturing interest, both payable Nov. 15.

THE directors of the Northern Pacific Railroad have authorized—subject to the approval of the holders of three-fourths of the preferred stock—the execution of a second mortgage for $20,000,000 on all the property of the company. The new mortgage is to be similar in terms and conditions to the general mortgage, subject only to the liens of the said mortgage. The preamble accompanying the resolution authorizing the second mortgage states that "there is now required to provide for the present unfunded debt of this company beyond the cash means available the sum of $9,459,920 83, and the additional sum of $5,500,000 will be required to complete the construction of the main line now under contract, including the bridges and tunnels, and provide and pay for all equipment required and contracted for. The finance committee was directed to open negotiations for the sale of $18,000,000 of the second mortgage bonds. The managers of the company say that they will not issue the other $2,000,000 of bonds at all. The preferred stockholders are called to meet in this city on Tuesday, Nov. 20, for the purpose of voting on the question. The following named officers have been re-elected: President, Henry Villard; vice president, Thomas F. Oakes; secretary, Samuel Wilkinson; treasurer, R. L. Belknap; general counsel, George Gray.

THE New Orleans *Times-Democrat*, says all through freight trains on the Southern Pacific road are now being equipped with the air-brake, and will have a schedule very nearly as fast as the regular passenger trains. By running in connection with steamships at this port, California freight can be delivered in New York and Liverpool five or six days sooner than by the regular all-rail route. The steamships have no freight blockades to contend with, and are never laid out on a side track. When they leave they keep moving at a rapid rate until they reach their destination.

THE "Racket" reporter of the New Orleans *Times-Democrat* is informed that large quantities of steel rails have been shipped recently to Texas, to be used in the construction of the Huntington branch road from Gonzales to Cuero. The line has already been located, and a great deal of the grade is now ready to receive the rail. It is the intention of the officials to have the road completed as soon as possible, in order to afford Southwest Texas an outlet to the Gulf. The Southern Pacific system, it is stated, will continue to construct branch roads into good territories, and thus establish important feeders for the main line, and also develop the country lying some distance off from the line.

THE work of grading the Pittsburgh and Neville Island Railroad has been commenced. The road is to be run the length of Neville Island, which is seven miles long, and cross to the mainland on the south bank at the eastern end of the island, connecting with the P. & L. E. R. R., and entering the city over that company's tracks. The road will be finished by next summer.

THE Railway Conductors' Convention at Kansas City, Oct. 19, elected grand officers as follows: Chief Conductor—C. L. Wheaton, of Elmira, N. Y.; Assistant Chief Conductor—Samuel H. Detries, of Toronto; Secretary and Treasurer—W. P. Daniels, of Cedar Rapids, Iowa; Senior Conductor—James Laughlin, of Kansas City; Junior Conductor—E. H. Belknap, of Galesburg, Ill.; Sentinels—L. P. Martin, of St. Louis, and J. D. Hamilton, of Canada; member of Executive Committee for three years—John N. Robinson, of Milwaukee; of Insurance Committee—C. A. Millard, of Elmira, N. Y. It was resolved to "use all honorable means to discountenance the use of intoxicating liquors among the members of the order while in the discharge of our train business and while transacting any duties relative to the order."

AMERICAN Railroad Journal

·ESTABLISHED·1831·

PUBLISHED MONTHLY BY THE

PHENIX PUBLISHING CO. OF N. Y.,

At No. 245 BROADWAY, NEW YORK.

GEO. F. SWAIN, PRESIDENT. L. FAIRBANKS, JR., VICE-PRESIDENT.
CHAS. T. VALENTINE, SEC. AND TREAS.

Entered at the Post Office at New York City as Second-Class Mail Matter.

SUBSCRIPTION RATES.

Subscription, per annum **$3 00**
Foreign subscription, per annum [including postage] **3 24**
Single copies **25**

All Subscriptions are payable in advance.

ADVERTISING RATES.

Space (3¼ in. wide).	1 Mo.	3 Mos.	6 Mos.	12 Mos.
1 inch	$4.00	$10.00	$17.00	$31.00
¼ col.	9.00	22.00	40.00	70.00
½ col.	15.00	40.00	70.00	120.00
1 col. (9¾ in.)	26.00	72.00	130.00	235.00
¼ page	15.00	40.00	70.00	120.00
½ page	26.00	72.00	130.00	235.00
1 page	48.00	115.00	210.00	400.00

For inside of covers, add 25 per cent.; for outside of back cover, add 50 per cent.; no advertisements will be taken for title-page.

The above terms are *net*, and for three months, six months or yearly contracts, are payable quarterly. Contracts for less time are payable after receipt of first number containing the advertisement.

MR. FREDERICK ALGAR, Nos. 11 and 12 Clements Lane, Lombard Street, London, E. C., England, is the authorized European Agent for the JOURNAL.

THE AMERICAN RAILROAD JOURNAL is sent regularly to all whose names appear on our books as those of subscribers, until they close their subscription by communication with the publishers.

ADVERTISERS and subscribers are respectfully cautioned against making payments to any person professing to represent this JOURNAL, *excepting he is able to show a written order from this office, duly signed by the president or secretary.*

☞ No railroad passes should be given to any one representing this Journal, unless he shows written authority to ask for same, signed by the President or Treasurer.

NEW YORK, OCTOBER, 1883.

Principal Contents of this Number.

RAILROAD NOTES 249-252

EDITORIAL :—
A Railway Mission Car 252,253
Credits 253,254

FINANCIAL DEPARTMENT 255,256

Incineration 257
Standard Railway Time 258
Facts About Color-Blindness 258,259
Railroad Medical Service 259-261
Lubricating Oils 261
English Railway Arrangements 261,262
Northern Pacific Railroad 263-265
Our English Letter 266,267

TRADE NOTES 267

Growth of Railroad and Dock Appliances 269,270

TRAMWAY DEPARTMENT 271-280
The Convention, 271; The Cable-Car System, 272; The Philadelphia Cable Road, 272; An Old Car Grip, 272; First Annua Convention of the American Street Railway Association, 273; List of Recent Patents for Inventions relating to Tramways, 276, 277; Street Car Fenders to Prevent Accidents, 278; Portable Turn-Table and Switch, 278; Gurney's Harness Saddle, 279; The Dickinson Car Brake and Starter, 279, 280; Help for the Horses, 280.

NEW INVENTIONS 281-295
Patents for Inventions Relating to Railways, Machinery, etc., 281, 282; Orne's Patent Car-Axle, with Independent Wheels, 283; Calyer's Balanced Slide-Valve, 283; A New Nut-Lock, 283; A Revolution in Sleeping Cars, 284, 285; Rowing for Health, 285; The Minnesota Steam Scraper, 285, 286; Improvement in Wire Suspension Bridges, 286, 287; Smith's Ash-Pan for Locomotives, 287; Device for Oiling the Guides of Upright Engines, 287; Noiseless Car Wheels, 287; The Daniel R. Murphy Locomotive, 288; Lighting Cars by Electricity, 288; Lake's Cow-Catcher, 288; Blessing's Steam Pump, 289; The Frances Registering Machine, 289; The Acme Steel Wheel, 290; Kasson's Lubricating Compound, 290, 291; How to Get Rid of Smoke and Stop Waste of Fuel, 291, 292; Heater and Purifier for Feed Water, 292; Panabaker's Excelsior Car-Coupling, 293; Water as a Lubricator for Hot Journals on Railroad Cars, 293; The Ball Engine and Governor, 294, 295.

A RAILWAY MISSION CAR.

FROM several of our exchanges we have noticed that there is a project on foot to build and equip a mission car for use on railways. The projector of this enterprise is a Mr. EDWIN A. HARRIS, of Fitchburg, who, for twelve years has been a railroad conductor, and connected prominently with the Railroad Men's Christian Associations in different sections of the State of Massachusetts. We are informed that for about nine months during the last two years he has traveled among railroad men in the South and West, holding religious meetings, and this project of a mission car has grown out of his experience and observation of what is needed to successfully prosecute religious work among the men in whom he is interested. We do not think that at first sight the project will strike thinking men favorably. There is something about special cars that gives them an air of snobbishness. An editor of a Western railway paper has one, certain noted actresses have theirs, men of wealth and sporting men have theirs. There is also a feeling among thinking men, that religion is an article that cannot afford to go through the country like a circus, attracting people to it by its noise and glitter. Religion to them means, not by power, nor by might, but by the spirit. It is not the thunder, but the lightning—not the earthquake, but the still small voice. Again are thinking men troubled when they see men leaving their business to start out as preachers, missionaries or revivalists. Many a man has been led to believe that he was religious when he was only bilious. A few cathartic pills restoring his physical nature to its normal condition, knocks religion out of him at the same time. Many men while in this bilious condition which they are pleased to call a religious frame of mind, have felt themselves called to leave their legitimate business to go and tell their benighted fellow men to look at them, and see the great work the Lord hath wrought. Thinking men look as invited, and inwardly wish that the man had gone to a bigger God, who would have done the work more thoroughly; or else that they had gone to AYER'S pill factory, in Lowell, instead. If the man is not suffering from biliousness, but is afflicted with old school theology instead, as the thinking man sits listening to his efforts, he has the feeling that a good wood sawyer has been ruined to make a mighty poor preacher.

Now the above remarks are written not in disparagement of Mr. HARRIS or his project, as we personally know nothing of him, but that he may not be discouraged if he does not find people as enthusiastic as himself in carrying out his project.

There are good and sufficient reasons why every man who sets himself up as a teacher of religion, should be severely scrutinized as to his character and fitness for

such. There are also many reasons why every proposed method should be carefully examined before adoption. There is none too much money hanging around loose for religious and charitable purposes, and that money which is available should be applied where it will do the most good. For ourselves, we are not in favor of multiplying the agencies for religious and charitable work, until the agencies already in force are better provided and cared for. Before mission cars are introduced, we would like to see mission churches better cared for. Before a missionary rides in a mission car from station to station, we would like to see a large number of missionaries now at work better fed and clothed. Still, with these feelings, we cheerfully offer Mr. HARRIS the free use of the columns of the JOURNAL to set forth his ideas and wishes to any extent he may wish, and if he is the right man and his project is feasible, we will use what little influence we have to help him along.

CREDITS.

THE question of credits is now forcing itself upon public attention in a way that will not be silenced. It is certainly time, for the anxiety to loan money and to sell goods has broken down many of the old-time barriers, until now, in business there is but very little distinction made between an honest man and a rogue. There is an opinion prevailing in the minds of men that if they wish to see a conservative man, they must take a look at a money-lender. There is no doubt but that this opinion is based in part upon fact, but by far the greater part is based upon what should be. Money-lenders are very careful when a new name on a note is brought to their attention. Take, for instance, a firm of great wealth and undoubted credit, not in the habit of issuing notes. When they wish a little accommodation and issue notes, they are very carefully looked up, and their affairs are sifted to the bottom before the accommodation is granted. The reason for this great carefulness on the part of the money-lender is, that he has never handled this paper before, and does not know how to handle it. But take the case of a firm always selling paper. When this firm first went into the market, their standing and responsibility were inquired into, their friends were interviewed satisfactorily, and the result was that the money-lender considered their paper a safe risk for the investment of his money. This firm always having paper on the market and always meeting same at maturity, become well known to the money-lending fraternity, and have no difficulty in getting what accommodation they need even when more responsible borrowers are refused. The reason for this is that the money-lenders are familiar with the sight of their paper. This is where the carelessness of money-lenders appears, and indicates a lack of the quality of conservatism. In this respect they resemble the locomotive engineer. When the engineer takes his first trip as such, with all the responsibility of life and property weighing heavily upon him, he is as careful as it is possible for human agency to be, and his train reaches the desired haven in safety without an accident. When he has had this responsibility long enough to get used to it, so that it does not weigh upon him, then he grows careless and indifferent, and a smash-up is the result. This is what we are now witnessing in the money world as between the money-lenders and concerns like the one last described. To-day the banks of the New England and Middle States must have in their vaults between 20 and 30 million dollars of notes, the makers of which have become bankrupt within the past 90 days. Now that there is a great change between the former days and now, in this matter of money lending, all old time merchants know full well. In those days a merchant required to be in good standing before he could get his bills receivable discounted at the bank where he kept his deposits. He had to be in unexceptionably good credit before he could sell notes of his own make, even when the banks knew that the money given on them was to be paid for merchandise, which was and still is a perfectly legitimate transaction. Now single name paper, if it is only known, passes almost without inquiry, and in too many cases such notes are not for merchandise, but to furnish the maker with means for speculative purposes.

This condition of affairs has arisen from two causes; first, the money-lenders finding it easier to handle one note of $5,000 than 100 notes of $50 each, and thus save themselves the trouble of making 50 entries and 50 collections, when one pays them just as well.

The second reason is the great abundance of money now as compared to former days. Money is worthless unless it is earning something, and when the money-lenders have more money than they can handle they grow less careful about loaning it, and therefore do not ask the questions they should. They run the risk of sacrificing the principal for the sake of the interest it earns.

There comes then a crash in the note market, the same as was experienced following a notable failure of Sept. 22, 1882, and money-lenders at a single bound, jump from the extreme of credulity to the extreme of skepticism, the same as the pendulum of a clock passes from its extreme limit on one side to the extreme limit on the other. Here is where the great injustice is done to the business world, there being for a time no distinction made between the deserving borrowers and the undeserving. The consequence is that suffering is brought upon a large class of trustworthy men, and that for no fault of their own. When the train is wrecked it is the fault of the engineer,

generally speaking, and so when there is a panic in the money market, it is generally the fault of the money-lender. He has been careless, and his carelessness has caused a wreck, and the wreck has weakened faith, and every would-be borrower, for the time being becomes an object of suspicion.

What we have written above regarding money-lenders and the borrowers of money, is also largely true of business men and their customers. Business is not conducted now on the same solid basis as in former years. We can remember an anecdote about a then leading merchant, and a young man buying his first bill of goods of him. The young man asked for a little credit, and it was immediately granted. The young man was astonished, as he expected to answer a number of questions and give good references. The old merchant told him this was not necessary, as he saw him in church the Sunday before with such a man, and he would trust anyone that that man would associate with. Then there was a distinction made, a marked line drawn between an honest man and a rascal. To-day there is not.

The question can very pertinently be asked why the merchants of to-day are less careful and particular than the merchants of former days, for there is no hiding the fact they will sell to rascals almost as readily as to honest men. Two reasons can be found for this state of affairs, one the great competition, the other, over-production. In reality there is but one reason, as the excessive competition is the outgrowth of over-production. Now this selling to a rascal the same as to an honest man is a great injustice to the honest man. The honest man will pay 100 cents on the dollar, while the rogue calculates at sometime to fail, and pay only 50 cents on a dollar. He can for this reason become a very dangerous competitor to the honest man, for he can sell his goods at less than cost, and when he fails pay 50 cents, and make his profit out of the merchant who has trusted him. The honest man, in order to pay in full, must get something above cost, and as the public prefer to buy where they can buy the cheapest, will pass his door and deal with the rogue. Thus the action of the merchant in selling to the rogue works great injury, not alone to himself, but to the honest man, the public, and to the rogue himself, for he is shrewd enough to see that as long as he can buy on credit and settle at 50 cents, he can undersell his honest neighbor and make the most money, and he has therefore no motive for reformation. In some States a man can fail and prefer his creditors. This is largely taken advantage of, and a man's wife or brother takes the bulk of the assets as a preferred creditor, and the man failing resumes business in his wife's or brother's name. This evil can be better understood when we state that within a week one concern has failed with preferences to unknown creditors for nearly $250,000. A loud call is now going up from Boston for a National Bankruptcy law, and if the coming Congress will enact such a one, either the Lowell Bill or some other equally as good, it will help business greatly, in the doing away of unnecessary failures. But after all, the great remedy is in the hands of the people themselves.

Merchants must make a distinction between honest men and rogues, not acting on the principle that because a man has just failed, he is a good risk for the next twelve months, and thus put in his hands the power to fail again The public have something to do in this matter also. They must be willing to pay for value received, which they can readily do by dealing only at one-price stores. A. T. Stewart built up his mammoth business on the one-price system, and everybody knew that a certain sum of money, whether in the hands of a little child or the shrewdest man, would buy the same quantity and quality of goods. To-day the great crying shame of the business world is that credit means so little. It does not add to the dignity of the man having it, for he may be a rogue; it does not add to the character of the merchant granting it, for he will give it to the rogue for the sake of getting rid of his goods. It does not help the public, for when these periodical failures come the innocent suffer with the guilty.

Our petition to the money-lenders and merchants is, that they return to the good old days of long ago, when giving credit was an act of grace, and the recipient of it was such because he was an honest man.

OUR esteemed contemporary, *The Artisan*, published at Nashville, Kentucky, finds fault with our spelling the word "Phenix," we suppose preferring the form "Phœnix" to that we have chosen. Nobody will be hardy enough to question that P-h-e-n-i-x does spell Phenix, and our preference for this spelling is that authorized by Webster. In short, convenience and the leading American authority are the reasons why the company issuing the AMERICAN RAILROAD JOURNAL is known to fame as the Phenix (not the Phœnix) Publishing Company. Next!

THE manner in which an advertisement is set is a consideration of great importance. Business announcements should be made pleasing to the eye of the reader, and the advertiser consults his interest very properly when he insists that this shall be done. The ideal of good advertising, so far as its matter goes, is reached when the expression is effective, and the style of setting both prominent and artistic. Our arrangements for the accommodation of people who have announcements to make, include an abundance and great variety of type, and the employment of hands whose superior merit as compositors is best

expressed in those of our pages appropriated to advertisements. The experience of all who advertise, and, of course, of those who patronize the AMERICAN RAILROAD JOURNAL, is that a steady continuance of the same announcement pays exceedingly well. It is a species of importunity which is sure of its object.

A BUREAU of information has been opened at the Grand Central Depot, this city, where the inexperienced and stupid traveler, as well as the intelligent and wide-awake itinerant in a hurry for information, can ply a courteous representative of the company with as many questions as their respective needs or idleness suggest.

Steel Rails.

A MANUFACTURING engineer writes to *La Metallurgie*, Paris, claiming that the success of rolling steel rails depends on the temperature at which the steel is rolled. He states from his own experience that bars which were finished at a bright red heat (and which were recognizable after cooling by their blue tint) were more fragile under tests by striking or flexion than those finished at a lower temperature.

DURING the month of August, 724 persons were paid benefits as members of the Baltimore and Ohio Employés' Relief Association. The care with which cash is paid out by the association appears in the publication, every month, of a sheet containing the exact details of said distribution. This sheet is intended to be posted in prominent positions, and is headed by the following announcement, printed in very conspicuous type: "This statement is published with a view of inviting the criticism of members upon payments made, and the secretary particularly requests to be informed of every case where benefits were not justly earned through total disability for the periods stated."

THE Boston and Albany road has instituted a movement in the proper use of English words. It no longer has "Gentlemen's rooms" and "Ladies' rooms" at its stations. They are now inscribed "Men's room" and "Women's room." This is certainly plain to understand. Nevertheless it probably does not hurt to call a man a gentleman or a woman a lady.

THE death was recently announced in England of Mr. George Remington, the engineer who in 1840, in conjunction with his father, projected the first metropolitan railway, called the Grand Junction Railway, which was to run from Snow Hill, Holborn, by way of King's Cross to the West of London. His project for a channel tunnel, published in 1864, was the commencement of the present movement in this direction.

A MIRROR has been attached to the cabs of engines on the Buffalo, New York and Philadelphia Railroad in such a way that the engineer has full view of his train without leaving his seat.

Financial.

WE do not note any improvement in the demoralized condition of Wall street interests, but on the contrary for several days back have witnessed what might be termed a semi-panic. This state of affairs exists too when there is plenty of money, and but one solution can be offered, and that is lack of confidence. There are plenty of sellers but no buyers except bears covering their shorts, and largely interested parties trying to sustain the values of their properties. The old-time business man cannot help but notice how limited in its workings is this disturbance on Wall street. The money market continues quiet, and business houses have no trouble in getting their usual accommodation from the banks. Hardly any change takes place in the bank rate, and no agitation whatever is noticeable in moneyed circles, no matter how many points a given stock drops off in a day. When we take into account how wide reaching such a condition of affairs in Wall street was years ago, and how little of it is felt outside of Wall street to-day, we have the surest guarantee that trading in stocks is almost, if not completely, confined to the brokers and their immediate friends. We are glad to record this because men in legitimate business are not safe when they step outside, no matter how promising the venture may appear. We have known many large and prosperous firms making money in following their legitimate callings, completely swamped and ruined when they stepped aside to engage in outside speculations, whether in stocks, real estate, or merchandise.

While we record the above state of affairs as regards Wall street, and the connection of the outside public with it, we are well aware that though the commercial world is in no sense mixed up with that state of affairs, yet there is no improvement to record in the commercial situation. This to the casual observer appears to be a rather singular phenomenon, but to the careful student of business life only proves how closely one branch of business is allied to every other branch. The struggle that is in progress at the Stock Exchange imparts a degree of discouragement to all the different branches of business, to the extent at least of preventing any improvement. This state of affairs is noticeable in those trades ministering to the pleasures of mankind, and somewhat noticeable in those trades ministering to their wants. To many others as well as to ourselves, this state of affairs is unaccountable, except we sum it up in the few words, "*lack of confidence.*"

From the "Financial and Commercial Chronicle," to which paper we largely refer when in doubt on financial questions, we copy the following regarding the income and condition of the Lake Shore and Michigan Southern Railroad.

"Within the past year or two the position of the Lake Shore has undergone considerable change. The through business for which it competes has to be divided among a greater number of lines than formerly, but, more particularly, the company has taken one of the new lines—the New York Chicago & St. Louis, or 'Nickel Plate'—within its own fold, and therefore become to a degree responsible for its success. It cost the Lake Shore $6,527,000 in 7 per cent. second mortgage bonds to get

control of that road, and this, of course, involves an increase in the fixed charges to amount of $456,890 per annum. The company's fiscal year is the same as the calendar year, and the report for the year 1882 was published in the CHRONICLE last May As the Nickel Plate purchase, however, was not effected till November of that year, the increase of fixed charges did not enter into the year's account. In the figures below for the year ended the 1st of July, 1883, the increase presumably counts for half its full amount, That the reader may see at a glance how the results for that year compare with those given in the report for the calendar year 1882, we have prepared the following for the two periods.

	1883.	1882.
Gross earnings	$19,492,089 00	$18,225,639 00
Operating expenses and taxes	11,436,736 00	11,057,807 00
Net earnings	$8,055,353 00	$7,167,832 00
Interest, etc., on assets	88,492 00	98,391 00
Total net income	$8,143,845 00	$7,266,223 00
Payments—		
Interest on debt	$2,969,125 00	$2,714,955 00
Rentals	417,461 00	357,086 00
Dividend on guaranteed stock	53,350 00	53,350 00
Sinking fund	250,000 00	250,000 00
Total	$3,689,936 00	$3,375,391 00
Balance	$4,453,909 00	$3,890,832 00
Eight per cent. dividend	3,957,320 00	3,957,320 00
Surplus	$496,589 00	def. $66,488 00

"The difference between the two periods is quite marked. While in the calendar year there was a small deficit below all charges and 8 per cent. dividends, in the year ended July 1 there was a surplus of pretty nearly half a million dollars, and this, too, despite the fact that there was an increase of $60,000 in the charge for rentals and $255,000 in the charge for interest in the latter period. It should be said that in the company's report no deficit for 1882 is shown, but rather a surplus of $183,511; but this is due to the fact that we have concluded in our statement the $250,000 contribution annually required for the sinking fund on the 1st mortgage bonds, counting it as a yearly charge, while the company omits it from income account altogether. As we have however, introduced the items in both the periods given, the comparison is not affected. Should we leave out the allowance for sinking funds, the surplus for the year to July 1 would be $746,589, as contrasted with the surplus of $183,511 for the year to January 1.

"The calendar year and the fiscal year embrace in each case six months of the same period of time, namely, July to December, 1882, and it follows therefore that the difference in results between the two years, marks the difference between the first half of 1883 and the first half of 1882. Hence we see that the first six months of 1883 show an increase over the corresponding six months of 1882 of $1,266,450 in gross earnings and $887,521 in net, which is somewhat less favorable than was the company's approximate exhibit, made at the end of the half year. Interest on investments realized $9,899 less, so that the actual gain in net income was $877,622. Against this, interest and rentals were augmented $314,545, leaving the real improvement over the six months of 1882 $563,077. That is, the amount left for dividends was that much greater in the first half year of 1883. But that period in 1882 was exceptionally bad, and notwithstanding the improvement made in the first six months of 1883, the company fell short of earning the half-year's proportion (4 per cent.) of the dividends on the stock. In other words, not the whole, but only about two-thirds of the deficit of $900,000 recorded in 1882 (after all charges and full dividends) has been wiped out. Too much, however, should not be made of this deficit for one-half a year. The period from July to Deeember is almost always much more profitable than the period from January to July—in fact the six months of 1881, when the trunk-line war was being waged, form the only exception to that rule, over a number of years. In 1882, for illustration, the whole of the $900,000 deficiency of the first half of the year was made good in the second half. In order to get a correct idea of the company's earning capacity and dividend power, a full year's results must be taken, and the table above enables that to be done either for the calendar year, 1882, or for the year to July 1, 1883.

"The figures for this year to July 1, must be accepted as in some measure limiting the outcome. We find a surplus of $496,589, but the calendar year will call for a larger charge for interest and rentals than is allowed in reaching that surplus. If we assume that the augmentation will be the same in the second half of the year as the table shows it to have been in the first half, then this surplus will be diminished in the sum of $314,545, reducing it to $182,044. Hence, if the company does as well in the six months from July to December, 1883, as it did in the same months of 1882 (which latter were the best six months in its history, and when neither the Nickel Plate nor the Chicago and Atlantic was in operation), the road will make enough to meet its increased charges, the full amount of 8 per cent. dividends, and yet carry forward a surplus of $182,000. If we take out the $250,000 for sinking funds, the surplus would be $432,000, and this amount the company could lose in net earnings (compared with July to December, 1882) in the last six months, and still meet interest and dividends. It should be said that some uncertainty exists as to the call that the Nickel Plate road may make upon the Lake Shore. The 6½ millions of its own bonds which the Lake Shore issued for that purchase we have already taken into account, but the Nickel Plate has a large individual indebtedness—15 millions first mortgage bonds, 10 millions second mortgage bonds, and 4 million equipment bonds, calling for $1,780,000 interest yearly, and it is not clear that the road can take care of that itself at the outset, in which case the Lake Shore might have to make good the deficiency.

"The statement of the Lake Shore's capital account on the 1st of July is compared with the same items as reported in the annual report on the 1st of January."

LIABILITIES.	*July* 1, 1883.	*Jan.* 1, 1883.
Stock	$50,000,000 00	$50,000,000 00
Debt	44,716,000 00	44,716,000 00
Current liabilities	2,834,632 00	2,133,677 00
Dividend due 30 days after date	1,016,005 00	1,016,005 00
Income balance	4,521,259 00	4,896,002 00
Total	$103,087,896 00	$102,761,684 00
ASSETS.		
Construction and equipment	$83,669,000 00	$83,669,000 00
Detroit, Monroe and Toledo Railroad	1,381,600 00	1,381,600 00
Kalamazoo and White Pigeon	610,000 00	610,000 00
Northern Central Michigan	1,357,000 00	1,357,000 00
Interest in Jamestown and Franklin R.R.	2,129,915 00	2,123,909 00
Interest in Chicago and Canada Southern	715,000 00	660,000 00
Stocks held	8,240,218 00	8,239,078 00
Bonds held	1,247,908 00	1,156,918 00
Supplies, etc	1,003,199 00	1,355,153 00
Cash, etc	1,662,234 00	1,138,587 00
Other items	1,071,822 00	1,070,439 00
Total	$103,087,896 00	$102,761,684 00

Incineration.

BY REV. ASHER ANDERSON.

THIS is the subject of an article to which thirteen pages of the *Princeton Review* for September have been devoted. If never before, certainly now, the subject has had a respectable prominence given to it, and the public may be assured that when once under way prejudice will have to yield, as it has yielded in many other instances, and doubtless the day is not far distant when cremation will be as popular a mode of burial as any which has hitherto been in vogue. It may be said that methods of burial are matters of human opinion merely. The Egyptian is pleased to wind innumerable yards of sheeting about a corpse for its preservation, because sometime the spirit will return and occupy the body again. The Indian erects three poles, from the upper ends of which is stretched a canvas on which the remains are placed. There is nothing canonical about putting the body into the ground. In Bible times the dead were placed both within a grave and rock-hewn tomb, and the assertion is a safe one to make that we are not compelled as Christians to adopt any particular method, except that which will secure health to those who still live. And this consideration is now emphasized by those studying modes of burial from a sanitary point.

The writer of the article is careful to set forth such a fact in its strongest light. The best authorities are quoted, as Sir Henry Thompson, who affirms "that no dead body is ever placed in the soil without polluting the earth, the air, and the water above and about it." And he goes on arranging a series of facts concerning burying in the ground and grave-yards, the reading of which makes one wish that not a body had ever been put beneath the soil of earth. He tells us of deadly exhalations with which the atmosphere of cemeteries is filled. How easy it is for those who linger at the burial of loved ones to carry with them germs of disease. That experiments have proven how earth-worms bring to the surface myriads of bacteria from bodies in the graves. What significant discoveries have been made against the cause of yellow fever epidemics, on which ground causes are found for the plague at Modena, in 1828, and in London, 1854, which latter was doubtless caused by overturning the soil in which had been buried the bodies of the plague stricken in 1665, and more still, that our wells, fountains and watercourses are all more or less contaminated because of their proximity to burial grounds.

The writer calls attention to the present methods of burial in large cemeteries where several are placed in one grave, coffin upon coffin, until the upper coffin is within a foot or two feet from the top of the ground. We remember passing through a cemetery, not 1,000 nor yet 10 miles from New York, in which are found graves where four, five, six and even seven bodies have been buried.

The writer does not refer to the indiscriminate burial of slain soldiers, whose bodies are laid in trenches not very deep and hastily covered up, though he may have had that in mind. A battle-field may in after years become a plantation or a farm, but the farmer never suspects that death in his home is occasioned by the zymotic conditions which lie at his very door.

We are not surprised that the reverend writer is a strong advocate for incineration. He asks, what is decomposition? Simply, oxidation. The body that is burned begins, yes even before it is burned, "to burn up." Under the circumstances of a burial this process of "burning up" is slow. The difference therefore between incineration and sepulture is a difference of time, since in both instances the bodies are consumed unto ashes. And we are persuaded that the writer is correct when he declares that any opposition to cremation is the outcome of prejudice, the same prejudice which never would allow a revision of the scriptures, or the changing of some ecclesiastical formula.

Mr. Bengless answers the manner and objections to incineration in an exceedingly favorable manner. Some will say, death by poisoning could not be determined, but all non-volatile mineral poisons would remain in the ashes. Some will say that deaths are too numerous to make it practicable; he replies, make the crematory large enough to do the necessary amount of work. Some will say, that it is heathenish; he answers saying it was heathenish before it became Christian. He also finds a recognition of the doctrine in the Old Testament. He argues in favor of incineration because: 1. It is a more healthful manner in which to dispose of the dead; there can be no decomposed matter to impregnate the soil and air and water with impurities. 2. It is decidedly a more cleanly method, since in this way the body is not given to the ground to become food for worms. 3. It is safer than burial, tombs like those of Stewart, Lincoln and Garfield will not have to be guarded. 4. It will remove from our minds any apprehension that the dead might have returned to life after burial. 5. It will allow us to have with us in this life and in all places where we reside, the ashes of the loved ones. 6. And it will prove to be more economical than the present expensive funerals.

We can imagine how quickly some will say, that cremation may not be consistent with the Bible doctrines of the resurrection, to which the answer is an easy and conclusive one to make. What will become of the martyrs, will they rise? We are glad that the subject has had given to it such important consideration, and we are satisfied now that the question is open, and its fuller discussion will bring us to much clearer light and a greater advance upon something which concerns the health of the nations.

We wish, before closing this reference to the article in the *Princeton Review*, to call attention to something upon which as yet we have seen nothing written and have heard nothing said. Science is the handmaid of religion; it is remarkable to observe how science is ever proving the truth of the Bible narrative. The book has lost nothing but gained immensely through the researches of the scientist. Now science is beginning to advocate incineration. Does it occur to the Bible reader that the world, by-and-by, will be destroyed by fire? After this there will be a new heaven and a new earth, and of that the Bible speaks "*there shall be no sickness there.*" No inhabitant of the world to come will ever say "I am sick."

INSTANCE OF CANADIAN ECONOMY.—An old servant of one of my friends, says a writer in *Harper's*, was bred to such careful habits that she wears out her calico robes without ever washing them, and yet she is considered to be neat and clean. Her parents had sixteen children, and they raised their entire family on one paper of pins and one catechism. Thorns were used, and other pins left at the house for the long winters.

Standard Railway Time.

W. F. ALLEN has contributed his views on this important question to the *Century Magazine*. Speaking of the effort now being made in railway circles to arrive at a "good enough" time, he summarizes a system proposed, and which will be considered at conventions of railway managers, to be held in Chicago and in New York City during the present month.

The system proposes: That the same standard should be used by all lines within sections as largely extended as may be possible, without entailing such a difference between local and railroad time as to cause inconvenience to the public. It is believed, however, that as exact time is seldom required, except for purposes connected with transportation, standard time could be readily substituted for local time in all cases where the difference would not be much over thirty minutes. That where a second standard becomes necessary, it should differ from the first by the simplest and most readily calculated variation—an even hour. That the changes from one standard to another should be made at well-known points of departure, and so far as may be possible at points where changes now occur, and where no practical difficulty would cause danger or inconvenience to railway operations.

The section of country which includes within its limits over eighty per cent. of all the railways lies within thirty degrees of longitude westward from the eastern boundary of the State of Maine. In railway circles, all roads east of Buffalo, Pittsburgh, Wheeling, Bristol (Tennessee), etc., are distinctively known as Eastern roads, and the lines west of those points as Western roads. A meridian line drawn centrally between their eastern and western extremities coincides almost exactly with the seventy-fifth meridian west from Greenwich. A similar grouping of the Western roads between Buffalo, Pittsburgh, etc., on the east, and the western boundary of Kansas on the west, develops the fact that the ninetieth meridian west from Greenwich is very approximately the central meridian for the system of roads embraced within that section. The seventy-fifth and ninetieth meridians being fifteen degrees apart, their time differs by an even hour. It is proposed that all railroads east of Buffalo, Pittsburgh, etc., shall use the seventy-fifth meridian time, which is approximately four minutes slower than the meridian time of New York; and that the Western roads shall use the ninetieth meridian time, which is nine minutes slower than Chicago time. The meridian equidistant from these central meridians crosses the railway lines in Ohio and other States at points where the peculiarities of railway operations prevent the change being made from one standard to another, and the difficulty has been met by extending the Western standard to the eastern termini of such roads at Buffalo, Salamanca, Pittsburgh, etc. Similar practical questions decide the standards for all roads south of the points named to Charleston, South Carolina. In Canada, all roads between Quebec and Detroit would use the seventy-fifth meridian time. The western limit of the ninetieth meridian, or "central time" system, is fixed at points on the great transcontinental lines, where a complete change is now made in the personnel of the hands in charge of trains, or, more technically speaking, at the ends of divisions. The standard for the next western or "Mountain" system is the time of the one hundred and fifth meridian, which coincides with Denver (Colorado) time, and, for the Pacific coast, that of the one hundred and twentieth meridian. The change from the Mountain to the Pacific system is proposed to be made at Yuma, Ogden, and Missoula, all convenient locations. For the extreme eastern section, east of Quebec and Vanceboro, the sixtieth meridian time may be employed.

Multiples of Greenwich time have been adopted for the system proposed, because they have been found to be the meridians best adapted for the purpose desired to be accomplished.

By the adoption of this system over eighty per cent. of the railroads will use but two standards where they now use forty, and these standards will differ from each other by an even hour. The standard for each section will differ from every other section by one, two, three, or four hours; hence the minutes will be identical in all the sections. At points where the changes are made from one standard to the next, as Pittsburgh, Wheeling, etc., similar changes are now made, the distinction being that instead of the readily calculated difference of one hour these changes now consist of differences of odd minutes varying from thirteen to thirty-six, numbers inconvenient to calculate, and which constantly cause annoying mistakes.

Facts About Color-Blindness.

IT appears from a lecture delivered recently in Boston, by our esteemed correspondent and an authority on his subject, Dr. B. Joy Jeffries, that the hundreds of thousands of examinations of people in all parts of the world made by experts the past few years, have shown that about four in a hundred males are more or less color-blind, whilst the defect is a rare one among females, only about one-fourth of one per cent. having been found lacking in the chromatic sense. This exemption is not attributable to their greater familiarity with colors, but is by the best authorities considered as simply a sexual difference.

The examinations and the study of the color sense induced thereby, have brought into notice the fact that the other ninety-six out of a hundred males, who have a normal color sense, are yet quite ignorant as to colors and color names. Dr. Jeffries's report to the Boston school board, of his examination of some twenty-eight thousand scholars, entirely substantiates the experience of his fellow experts in other parts of the world. In consequence, the attention of educational authorities has been directed to the question of color teaching for some three years past. Its necessity has been gradually recognized, and finally the Boston school board has decided to introduce some systematic teaching in the primary department, in place of what has proved nearly valueless.

The lecturer illustrated the uselessness of asking the names of colors to test the chromatic sense, and proved the value of the Holmgren method by the fact that the person examined need not speak, need know nothing of colors or even have seen any. The misuse in this respect of the method, and its imitation by railway officials in testing employés, caused a smile in its narration. As our readers know already, the Holmgren method compares, not matches worsteds. Dr. Jeffries claims that it has also pointed out the true means of teaching color, and the education of the normal color sense. The speaker

showed how the ear had been taught, the form perception educated, and the hand instructed, by thorough methods in our schools, and how the color sense could be educated by very simple means. He had, like others, thought out various plans, but finally turned to that of Dr. Magnus, based on Holmgren's experience.

As future railway employés will, of course, be males, and as most of these in all probability will have been educated in public schools, the action of the Boston school board in the premises, which, we learn, is the first official recognition of the subject anywhere, cannot be too highly commended by a railroad paper. We think that it certainly deserves imitation.

RAILROAD MEDICAL SERVICE.

BY S. S. HERRICK, M.D.,
SECRETARY BOARD OF HEALTH, STATE OF LOUSIANA.

ITALY CONTINUED.

The Pension Fund (La Cassa-Pensioni.)

AMONG the papers relating to the medical service of the railways of Northern Italy, which I have received, is the Constitution of the Association for Mutual Relief by Pensions, styled Pension Fund (*Cassa-Pensioni.*) This association, founded Jan. 1, 1862, by the Concessionary Society of the railways of Lombardy and Central Italy, has been extended to the employés of the railways of Northern Italy. Its object is to provide pensions for themselves, their widows and orphans, and it operates independently of the *Consorzio di Mutuo Soccorso*, previously mentioned.

The Pension-fund is sustained: 1. By deductions from the wages of employés; 2. By a contribution from the railroad company; 3. By legacies and donations; 4. By interest on the investment of funds.

Contributing members have 3 per cent. deducted from their monthly wages, in addition to deductions for sickness, absence, suspension, the Relief-fund, the Clothing-fund, tax on movable property, etc. This is paid during the whole term of service, and is applicable only to wages proper, and to additional pay of a permanent character, such as premiums for extra work, the savings and back-pay recovered by the *personnel* of trains; and does not apply to special allowances for office-rent, traveling, lodging, etc. There is a further deduction of one-twelfth of every increase of pay, to take effect from the first month after the increase begins. In any month the three-per-cent. deduction is reckoned upon the pay of the preceding month.

The company contributes monthly to the pension-fund a sum equivalent to the 3 per cent. deduction upon the wages of employés and the arrears paid to old employés.

Employés assigned to permanent service with a fixed annual pay have full right and obligation to become members of the *Cassa-Pensioni*, provided they are not over 35 years of age. Those entering service above this age are admitted to participation in its benefits only upon application, and by vote of the directory after proposal by the Committee of Administration. The same rule applies to employés not Italian by birth and those not naturalized as citizens. Those employed by the day or only temporarily can not be admitted to membership. Every one, previous to admission, must present to the Committee of Administration his certificate of birth.

Any member may be put on the retired list by decision of the Council of Administration. Any member who has contributed at least six years, is entitled to a yearly pension equal to five-sixths of the amount which he has paid in annually, provided this pension do not exceed three-fourths of his last salary subject to deduction. If the employé, when put on the retired list, was attached to train service, the maximum of the pension will be calculated upon his last rate of pay, augmented by the annual mean of the allowances which he has earned by premiums for over-mileage, savings and deductions returned. Any employé who has reached the regular limits of age and of service, and been a contributor not less than six years, can be placed on the retired list, whenever for any reason he is unfit for duty.

After contributing for 25 years to the pension-fund, any employé is entitled to a pension on reaching the age of 55 years. Those engaged in the various duties of train-service have the same right after 20 years' contribution, provided they have attained the age of 50 years; but this advantage of earlier right to pension is lost on transfer to another branch of service.

Whenever through injuries received in service, duly certified, an employé becomes disabled and is so declared by a medical commission, he is entitled to the normal pension, as if he had been a contributor for 20 or 25 years, according to nature of service, whatever may be his age or duration of service; calculating the deductions for completion of his years of service upon the basis of his last wages. If by infirmity contracted in the line of duty, the employé has become disabled after contributing for six years to the pension-fund, he shall be entitled to the usual annual pension, according to payments made, subject to increase on favorable report by the committee to the Directory, but not to exceed three-fourths of his earnings.

The widow of an employé, dead after six years' membership, is entitled to an annual pension equal to five-ninths of the husband's earnings. If his death was caused by injuries received in service, the widow's pension will be the same as if he had contributed for 20 or 25 years, according to nature of service. If the husband died through infirmity contracted in the line of duty, the Directory, on recommendation of the committee, can increase the usual pension; but in no case can it exceed one-half the wages received by the husband at time of death. The widow of a pensioner is entitled to continuance of two-thirds of his pension. Unless the husband died in consequence of injury received in the line of duty, the right of the widow to its continuance is conditioned that the marriage took place at least three years prior to his death or retirement, and before he had reached the age of 50 years; but the first of these two restrictions may be lessened by the committee. The widow of a contributor not fully entitled to a pension may receive, as a relief once for all, an allowance fixed by the committee, not exceeding one year's wages or pension of her husband; and, in case there are minor children, each one is entitled to one-tenth

of this allowance, amounting collectively to not more than one-half, while the remainder goes to their mother.

Legitimate children of a deceased member are entitled, up to the age of 18 years, to the following allowance: *a.* The mother living, each child receives one-tenth of the pension which the father enjoyed at the time of death, or to which he was entitled, provided that the total amount assigned to mother and children collectively must not exceed 75 per cent. of the father's pension. *b.* After the death of both parents, each child receives one-tenth of the father's pension, provided that the total amount assigned to the children must not exceed 50 per cent. of the same. *c.* If the deceased employé had married twice and left children of both marriages, together with the last wife, all are entitled to pensions; then the difference between two-thirds of the husband's pension (amount accruing to the widow when childless) and three-fourths (maximum allowed to widow and children collectively) goes to the children of the first marriage, reversible to those of the second when the former have reached the age of 18 years. *d.* When only the minor children of the first marriage are entitled to the pension, each receives one-tenth of the father's pension, amounting collectively to not more than one-half of the same; while the other children, together with their mother, may receive once for all an allowance equal to one year's wages. In all these cases, the pensions accruing to minors will be paid in full to their legal representative. Orphans of less than 18 years of a member deceased without acquiring right to a pension, can receive collectively a relief once for all equivalent to what their mother would receive, were she alive. The pension of a male orphan ceases whenever he goes into service of the company; and that of a female on contracting marriage.

In case a regular pension amounts to less than 100 *lire* annually, the committee may settle it by a single payment, which can be in no case more than the employé's wages for one year. Any one who has been invalided and retired from service, may have his pension adjusted, upon demand, according to conditions previously mentioned. Pensions are paid quarterly on production of certificates of survivance by the claimant. In case of a widow, the certificate must furthermore prove permanence of widowhood. All pensions granted by these regulations are considered quittance of claim.

Pensions run as follows: 1. For the employé, from stoppage of wages to death. 2. For the widow of a contributor, from stoppage of her husband's wages or pension to her own death; but on her marrying again, it ceases immediately. 3. For minor children, from stoppage of father's or mother's pension to the age of 18 years, conditions elsewhere noted being excepted.

The employé forfeits claim to pension, by decision of the Directory: 1. On voluntary retirement from service. 2. On being required for military service. 3. Whenever, through infirmity or disease contracted independently of service, he has quit work, having contributed less than six years to the pension-fund. 4. Whenever the man's service has ceased within six years of contribution, by reason of abolishment of his occupation. 5. On conviction of felony, before or after adjudication of pension. 6. On conviction of misdemeanor which involves loss of employment. 7. Whenever, by decision of the Directory, he has been discharged for willful violation of rules, for acts or threats against superiors, for theft, for insubordination or grave neglect of duty. In case of forfeiture for 2, 3 or 4, the employé can claim the refunding of his contributions, without interest: in the others, the payments accrue to the pension-fund.

The widow forfeits claim to pension: 1. When, at death of husband, through her own fault she was living separate, without alimony, whether judicially or extra-judicially. If, however, she had enjoyed alimony, the committee will decide the limits of pension, in no case greater than her alimony, nor less than the allowance made to widows of those who have not acquired right to pensions. 2. By reason of scandalous conduct or conviction of crime. In these cases, as well as when the widow marries again, minor children are regarded as complete orphans, and are provided for as previously stated.

Orphans likewise forfeit pensions on conviction of crime.

Whenever the resources of the Pension-fund evidently exceed all needed requirements, the contributions may be temporarily reduced, both for employés and for the company. If, on the other hand, they are found inadequate, the Directory may either increase the contributions of the employés and of the company, or reduce the pensions. In the last case, pensions of 600 *lire* or less are not subject to reduction. On augmenting or reducing contributions, pensions are always adjusted as if the deduction were 3 per cent. of wages.

The *Cassa-Pensioni* is administered by a committee composed of one of the honorable Directors designated by the Council, of the General Manager, of the Superintendents of Operation and of Maintenance, of the Chief Attorney, of the Chief of the Department of Accounts, of a superior employé in the office of General Control, and of several superior employés in various branches of Operation and Maintenance, these last employés to be named by the Directory. This committee is presided over by the member who is a Director of the Company; in his absence by the General Manager; in his absence by one of the Superintendents. Six members constitute a quorum, and questions are decided by a majority of members present. Meetings take place at least quarterly.

The Committee decides finally: 1. Upon the collection and disbursement of the funds of the Association. 2. Upon the settlement of pensions and allowances in the regular way. 3. Upon all ordinary cases arising under these regulations. It acts in advisory capacity: 1. On applications for increase of pension, in cases provided for in the regulations. 2. On claims which may eventually be made upon it. 3. On all questions to which the present regulations are applicable. 4. On modifications to be made to these regulations. The minutes of sessions of the committee are communicated to the Directory. At the end of each year the committee renders a report of the condition of the pension-fund and of its administration of the same to the Directory, and furnishes copies to those interested.

The Association can not acquire nor possess immovable property not strictly necessary for its purposes, and must immediately sell whatever has fallen to it by expropriation, abandonment or donation.

The Committee, by authority of the Directory of the Company, may initiate and conclude treaties, either by a general fusion or any other arrangement judged conducive to the interests of the Association, with institutions of

similar nature created either by government or by other companies. In case of annexation of new lines or fusion with another railway company, employés in the latter may be admitted from date of annexation or retroactively, as may be determined by special action.

[*To be continued.*]

Lubricating Oils.

A subject of great importance, but very much neglected by manufacturers and railroad men, is the lubricating of machinery and rolling-stock. This is generally looked upon as of little importance, and would probably receive no attention at all were it not occasionally forced on their minds by heated bearings causing stoppages and repairs, saying nothing of accidents for which they can assign no direct cause. There are very few traveling people who have not experienced delay from overheated bearings, and witnessed the anxious efforts of the train hands to overcome the difficulty, and thus guard against disastrous consequences.

Many people entertain great fear of accidents, the cause of which it is almost impossible to anticipate, even with exertion of utmost care; but much greater would be their apprehension did they know that careless neglect of this important subject and false economy daily add an important factor to the possibility of accidents.

Now wherein consists such want of care and false economy? In the use of poor and apparantly cheaper lubricants. It is rarely the case that managers or purchasing agents of railroads possess any knowledge of the characteristics of lubricants, and fewer still have the least conception of the theory of lubricating. Even some of the most accomplished and experienced machinists and engineers are sadly ignorant on the subject, and fall an easy prey to designing oil concerns, whose sole object it is to sell their residuum to best advantage.

Lubricating is the interposition of substances which absorb the frictional heat generated by motion and, transferring it into space, prevent the parts in motion from abrading each other and becoming heated. In order to do this effectually, the interposing substance must be free from grit, (inert matter) that could promote abrasion of itself, and must possess the ability to fully absorb, but in the same ratio dispose of, all the heat produced by the motion. It should therefore retain a nearly uniform consistency through all seasons of the year, possess enough viscosity to maintain its adhesiveness, and be of such fire test as to secure eradiation proportionate with its heat absorbing quality.

Thus it will appear that it is not enough to mix still residuum with light oils, and produce a mixture of apparently satisfactory gravity. Residuum is seldom free from grit, and the oil wherewith it is diluted is of such fire test as to evaporate too fast; it is not able to eradiate all the heat absorbed by the heavier residuum. The oils generally used for this purpose contain all the lighter petroleum products, and frequently even the cheaper grades of benzine alone are used. The danger of using such oils can be easily understood; they are dangerous in store and factory, and while in use their rapid evaporation leaves the gritty and charred matter of the residuum to accumulate, and finally abrade and heat the bearings.

Only such oils should be used as have been freed from their lighter products and mixed with fatty matter, or such residuum as has been previously freed from all grit and scorched impurities. They cannot be obtained at so low a price as the cheaper mixtures, but aside from their greater efficiency will prove themselves cheaper in the long run. The plea often made that the hands pour the oil on anyway and waste too much, is absurd. When the oil is inefficient and when poured upon bearings runs through as fast as it is put on, reckless use becomes unavoidable, and the using of better and efficient lubricators alone can prevent it. The question of economy lies not in what an oil costs, but in what it is able to perform. Increased efficiency, reduced expenses of repairs, saving of time and labor (the oil lasting longer) and greater safety, make the higher priced oils the cheaper.

English Railway Arrangements.

We hear a great deal at home about the annoyance of the compartment system of railway carriages, but it has its advantages. Each compartment opens independently of the others, and so a train is loaded and unloaded very rapidly. There is nothing whatever of the annoying delay that we have in getting in and out at stations. It is all done at once and without confusion. As for tickets, you do not give them up until you arrive. There is, therefore, no bother of continually showing a check to the conductor. The names of stations are not called out, but they are very plainly marked in a dozen different spots at each place, and the guards can always be called to from the window for information. The guards are uniformed and look very well, but the porters and station men are more elegant yet. At Hereford, for instance, which is but a small, quiet town, our baggage was taken possession of at the station by an elegant and stately gentleman, wearing a stove-pipe hat and a suit of dark blue made up in the long coat fashion. It seemed like a favor to have him consent to accept a sixpence. But they all do consent. Some excellent American, Hawthorne I think, remarked that his only regret in thinking over his experience in England lay in the fact that he hadn't offered the high chancellor a shilling. At every railway station, suppose you wish to stop over, there is a "left luggage" room where for four cents (tuppence) they take care of your baggage. Every station, too, has a capital book-stall. It is not merely like ours, a news-stand, but it has good literature, and a plenty of it. Then, too, each important station has its restaurant. Every restaurant is a rum-shop. There is every facility for a good meal, but besides that, certainly on some roads, the opportunities for getting drunk surpass anything we know in America. Pocket bottles, thin but copious, are spread out on the counters for sale, containing rum, brandy, whiskey, gin, sherry or port, etc., and boys go from car to car offering these for sale. There is nothing done on the sly; and at the lunch-counter there is often a regular bar, always presided over by a neat and tidy girl, who sells the strongest liquors with the mildest expression of countenance. Apparently nobody is ashamed to drink. They all do it openly and make no secret of it. In London, indeed, so much of it is done that they sell champagne by the glass—a liquor which is supposed to spoil by opening. "Champagne, one six-

pence" is a common sign there. Great attention is given to the English railway stations. At Shrewsbury, for example, a city of half the size of our Hartford, or say 25,000 inhabitants, the station cost $500,000. Along the route a grade crossing is scarcely ever seen; when it is, the gate is kept shut, except when some one wants to cross the track. Its normal condition is to be closed. Tunnels and bridges are frequent. Over these in many places ivies are grown, and other climbing vines; and at many stations the cultivation of flowers, stimulated by prizes offered by the companies, has been carried to an art. Crossing the tracks at stations is not feasible, and walking on the tracks through the country is forbidden. Look from the car window half a day and you see no one on the track except an occasional railway employé. The whistle scarcely ever blows except at stations. The guard notifies the engineer that all is ready by blowing a shrill little whistle which he carries in his pocket. The engineer pipes a shrill answer from the locomotive whistle, and off you go, quietly and without the infernal bell-ringing and yelling and leaping on the last car that we are used to. The cars at home are all lettered in large letters with the name of the company that owns them. Here there is never any of that. When now and then one is marked, the lettering is small and hid away in some scroll on the door. But the distinctions of first, second and third class are marked very clearly in large type over the door of each compartment. Sometimes they have also another mark. If a compartment is secured before the train leaves they fasten on its window a printed card labeled "Engaged." The other day I saw a party of girls shut up in one of these railway carriages, and neatly marked in that way, "Engaged." They looked satisfied.

Railways in Great Britain.

A PAPER read in London recently by Mr. Edward J. Waterston gave some interesting statistics of railways in Great Britain. In 1840, said the essayist, there were but 1,435 miles of railway in the United Kingdom; in 1850 they had risen to 6,621 miles; in 1860 to 10,433 miles; in 1870 to 15,237 miles; in 1880 to 17,933 miles; and now, according to the latest returns issued, the United Kingdom alone possesses 18,457 miles of iron highway. (It should be borne in mind that double tracks are counted as single in Great Britain and Ireland, so that according to the method of railroad measurement adopted in this country, the total length of miles would be much larger). But, if astonished at the progress of the construction of railways, we should be more astonished at their results. We had now, as had been said, 18,457 miles of railway, constructed at a cost of £767,899,570, carrying, exclusive of 599,568 season ticket-holders, some 654,838,295 passengers (37,204,569 first-class, 66,695,817 second-class, and 551,937,909 third-class), and, in addition, 256,215,833 tons of goods, the receipts from the former being £28,796,813, and from the latter £37,740,315; the working expenses being £36,170,456, net earnings £33,206,668, and earnings on capital 4.32 per cent. Roughly speaking, about five-eighths of the railways of the United Kingdom, with their invested capital, belonging to England and Wales, two-eighths to Scotland, one-eighth to Ireland. Looked at superficially, the number 655,000,000 passengers carried in one year might seem large, but in reality it was not so, when the figures were properly analyzed. The population of the United Kingdom was, roughly speaking, 35,000,000; therefore, the total railway traffic was something less than 19 times the population. The traffic on many lines traversing, it might be, thickly populated parts of the country, was double, treble and fourfold that amount.

Steam Whistles.

A CORRESPONDENT of the *Railroad Gazette* recommends a steam horn instead of a steam whistle. He says that "as a general rule the steam whistle must be very powerful to be effective beyond half a mile. Now, if instead of a whistle a horn were to be used, the gain in useful effect would be great, while the disagreeableness of tone would be much, if not entirely reduced. The form of such a horn with a mouth-piece or forcing tube would be extremely simple, of inconsiderable expense (less than that of the ordinary whistle), and instead of the screeching sound of the latter, it would yield the mellower tone of the modern tuba or cornet-a-piston, to which we suppose most persons will not object." There seems to be a good opportunity here for some ingenious person to exercise his inventive talents.

WORN OUT RAILWAY EMPLOYÉS.—By the way, I was speaking to a very intelligent station-master the other day about the crop of holiday railway accidents. "Do you think," I said, "it has much to do with the long hours?" He at once replied, with the utmost warmth and eagerness, "Sir, you can take your stand upon that. If you are ever in company where that question is started you will be right in denouncing the long hours. No one will be able to reply to you then. Undoubtedly, the men are worn out, oppressed, and fatigued beyond all powers of attention. Look at that poor fellow in yonder signal-box," and he pointed to one hard by: "he has been there for twelve hours at a stretch—every day it is the same thing. That man has not even time to snatch a quiet meal, no rest, dare not relax for a minute. Well, what's the consequence? Some break down and die off, others go off their heads, and you never can tell when the break-down is coming. The men won't give in—it's their bread; the station-master daren't complain, and the directors know it. They don't care for the public safety; they can afford the damages. Human life is nothing to them, nor human hearts and brains either. "The thing," he added, "is scandalous, shameful, notorious." At that moment an express was sighted; his quick eye caught the pointsman flagging. "John, look sharp!" and he hurried off. "John" was in time, but only just. The train flew by like a hurricane, and "John" lounged away languidly with his hands in his pockets, looking fit for the hospital.—*London Truth.*

THE Eames Vacuum Brake Company, Watertown, New York, has issued a pamphlet explaining the peculiarities of its system. Apart from the interest of the subject, which is treated with skill and adequately illustrated, this production is desirable for the remarkable beauty of its letterpress and general appearance.

Northern Pacific Railroad.

THE following is a comparative statement of the earnings, operating expenses, etc., of the Northern Pacific Railroad for the years ending June 30, 1882 and 1883:

Earnings:	1882.	1883.
From freight	$3,909,424 20	$5,409,080 67
" passengers	1,302,260 80	2,099,745 81
" mail	52,306 56	87,281 62
" express	149,293 18	229,259 22
" miscellaneous	17,021 82	30,091 94
Total earnings	$5,430,305 56	$7,855,459 26
Operating expenses:		
Conducting transportation	$ 749,630 31	$1,240,526 96
Motive power	967,694 74	1,579,529 68
General expenses	268,508 50	299,909 90
Maintenance of road and structures	952,919 56	1,393,711 06
Maintenance of cars	273,975 45	439,389 22
Rentals and taxes	315,111 95	383,862 95
Total expenses	$3,572,840 51	$5,336,929 77
Net earnings	$1,857,465 05	$2,518,529 49

—to which add dividends on investments in 1883, $12,024, making a total of $2,530,553.49, from which deduct twelve months' interest on funded debt, $1,209,837.53; six months' interest on dividend scrip, $139,224.63; adjustment of sundry accounts and claims against United States Government, $31,908.21—leaving a balance of $1,149,583.12.

Compared with the year 1881-'82 the gross earnings show an increase of $2,425,153.70, or 44.66 per cent., with an increase in expenses of $1,764,089.26, or 49.37 per cent., making the increase in net earnings $661,064.44, or 35.59 per cent. The ratio of expenses to earnings was: in 1881-'82, 65.80 per cent., in 1882-'83, 67.94 per cent—an increase of 2.14 per cent.

The average number of miles of road operated in 1881-'82 was 797; do. in 1882-'83, 1,497—an increase of 700 miles.

The gross earnings per mile of road in 1881-82 were $6,318.85, the expenses (including rentals and taxes) $3,830.46, and the net earnings $2,488.89; in 1882-'83 the gross earnings per mile of road were $5,247.47, the expenses (including rentals and taxes) $3,565.08, and the net earnings $1,682.39—showing a decrease in gross earnings per mile of road of $1,071.38, with a decrease in expenses of $265.38, making the decrease in net earnings $806.

While a satisfactory increase is shown in the earnings per mile of the older portions of the road, the ratio of earnings to total mileage was necessarily less for the past than for the preceding year, from the fact that of the 700 additional miles of road operated, nearly 600 traversed regions where settlement and business had to be created by the road as it advanced. Now that a connection of the tracks has been effected, and the line opened for through traffic to and from the Pacific Coast, the earning capacity of this large mileage will soon be demonstrated. It should further be borne in mind that all portions of this new mileage run through a country abounding in natural resources, and certain to develop a steadily increasing local business. The above exhibit must therefore be held to be gratifying for a company pushing its tracks from the two sides of the continent through regions scantily peopled or entirely unsettled, to a connection in the Rocky Mountains, and dependent for its earnings wholly upon its local traffic until that connection was made. It is also an encouraging indication for the future, and serves as a guide to a just estimate of the income that may be expected with the completion of the line as a direct route to the Pacific coast, and with the fuller development of the immense regions to which the Northern Pacific furnishes the only means of communication by rail.

The number of passengers arriving on the company's lines at the eastern terminal stations, viz.: St. Paul, Minneapolis, Duluth and Superior, in 1882-'83 was 62,329; and the number departing therefrom, 75,739—a difference of 13,410. The total number arriving and departing was 138,068, against 106,886 in 1881-'82—an increase of 31,182.

The number of through passengers (from and to other roads) carried on the eastern divisions in 1882-'83 was 32,489, of whom 11,952 were first class, and 20,537 second class and emigrant; the number of local passengers carried was 418,498, of whom 346,752 were first class, 31,501 second class and 40,245 commutation—total through on local, 450,987, against 297,680 (19,446 through and 278,214 local) in 1881-'82, an increase of 153,307. The number moved east in 1882-'83 was 198,475; do. west, 252,512. The number moved east in 1881-'82 was 134,165; do. west, 163,515. On the western divisions the number of through passengers was 26,872; local do. 73,291—total, 100,163, of whom 52,982 were carried east, and 47,181 west. The difference in the number of passengers carried eastward and westward on the eastern divisions was in 1882-'83 54,037 and in 1881-'82 19,350, representing largely, though not directly, the immigration into Northern Minnesota, North Dakota and Montana. The increase in the passenger earnings of these divisions was 42.6 per cent.

The number of miles traveled by through passengers on the eastern divisions in 1882-'83 was 10,591,423; do. by local passengers, 37,596,459—total, 48,187,882. In 1881-'82 the number of miles traveled by through passengers was was 5,699,647; do. by local passengers 28,629,371—total, 34,329,018; showing an increase in through passengers of 4,891,776, and in local passengers of 8,967,088—a total increase of 13,858,864. On the western divisions the number of miles traveled by through passengers was 2,632,235; do. by local passengers 3,589,665—total, 6,221,900.

The number of tons carried eastward in 1882-'83 on the eastern divisions was 257,280; do. westward 532,726—total, 790,006. In 1881-'82 the number carried eastward was 169,866; do. westward 485,209—total, 655,075; showan increase in tons eastward of 87,414; do. westward 47,517—total, 131,931. On the western divisions the number of tons carried in 1882-'83 was 303,330, of which 132,341 was east bound, and 170,989 west bound.

The number of tons carried one mile east on the eastern divisions in 1882-'83 was 59,220,256; do. west 159,336,992—total, 218,557,248. In 1881-'82 the number carried east was 39,518,027; do. west 142,333,510—total, 181,851,537, showing an increase in the freight movement of 36,705,711, of which 19,702,229 was east bound, and 17,003,482 west bound. The number of tons carried one mile on the western divisions in 1882-'83 was 25,002,438, of which 15,497,462 was east bound and 9,504,976 west bound.

The average haul for each ton of freight on the eastern divisions in 1882-'83 was: east bound, 230.2 miles; west bound, 299.1—both divisions, 276.7. On the western divisions the average haul was: east bound, 117.10 miles; west bound, 55.59 miles—both directions, 82.42 miles.

The increase of east bound freight tonnage on the eastern divisions was 51.45 per cent., and of west bound 979 per cent., the total increase being 20.60 per cent. The increase of freight earnings on these divisions was $869,393,92.

On the western divisions both passenger and business show a steady and important growth. On the Pacific division, including the Cascade Branch, the gross earnings increased from $272,676.90 in 1881-'82 to $420,871.79 in 1882-'83, a gain of $148,194.89, or 35.2 per cent. At the same time there was a decrease in operating expenses of $23,645.85, or 8 per cent.

The Pend d'Oreille division did not come into the hands of the operating department until May, 1882, and comparison cannot be made between the earnings of this year and last. The other divisions of the road west of the Rocky Mountains have only been operated a few months. On this portion of the main line, extending from Wallula to a point in the Flathead Reservation, the gross earnings were $816,884.79, and the net earnings $269,753.54. This is considered an excellent exhibit in view of the fact that a large part of the mileage is new road, through a wild region just beginning to attract settlement and develope traffic-producing industries.

The quantity of wheat moved during the year over the eastern divisions was 5,102,368 bushels, or 153,071 tons, an increase of 36,271 tons over the previous year. The grain elevators on the line of the road have a total storage capacity of 6,035,000 bushels.

Arrangements have been made for the transportation of grain in bulk from Eastern Washington and Oregon to Tacoma, and for sacking it for shipment at that place. The completion of the Portland-Kalama line, and the establishment this fall of the transfer ferry across the Columbia, near the latter place, will open a large grain traffic between the interior and Puget Sound, thus adding to the freight department a new and important source of earnings.

The shipments of coal from Carbonado, on the Cascade Branch, during the year were 82,012 tons, and from South Prairie, 10,257 tons. The present output of the Carbonado mines is about 600 tons a day, and this will shortly be increased to 1,000 tons. The coal mines at Wilkeson have recently been reopened by the Oregon Improvement Co., and will soon make daily shipments.

The ten refrigerator cars have earned during the eight months that they have been in service $14,796.90, the total expenses including interest on cost and allowances for depreciation being $7,405.

On the 4th of July last, 511 tons of silver bullion were shipped east from Helena (the center of mining for the precious metals east of the Rocky Mountains) in a single train, and the Barker mining district, north of Billings, is beginning to send its products over the road. During the past few months it has shipped from Billings about 250 tons. The transportation of bullion and machinery and supplies for the Montana mines will form an important item in future freight reports.

During the present season, 40,000 head of young cattle have been carried over the road to Montana. The shipment of wool this season will be nearly, if not quite, one million pounds.

The gross earnings of the express business carried on by the company were $229,259.22, the expenses $80,475.20, and the net earnings $148,784.02, an increase over the previous year of $45,848.83, or 44.5 per cent. In the expenses are included the entire outlay for equipment, on office furniture, on fixtures at St. Paul and Minneapolis, amounting to $17,014. The service was extended during the year over 560 additional miles, and 33 new offices were added.

The Northern Pacific Express Company, whose immediate purpose is to carry on the express business over this company's roads and connecting lines of transportation, was recently incorporated and organized under the laws of the State of Minnesota. It began business on the 1st of September, 1883.

During the past year 293 miles of new telegraph poles have been erected on the main line. The company now have 1,191 miles of poles on the main line, not including 98½ miles, used jointly with other companies, and 308½ miles on branch lines; 974¾ miles of wire have been strung under contract with the Western Union Company —199¾ miles of exclusive Western Union wires and 782 of exclusive railroad wires. There are on the line 154 offices and 194 operators. The cash receipts from commercial business during the past year were $72,594.88 against $45,695.70 during the previous year, an increase of $26,899.18—which increase was more than the total business of 1881.

The large increase in the mileage of road operated has necessitated a corresponding increase in equipment. At the close of the year ending June 30, 1883 (there having been added during the year, 131 locomotives, 71 cars for passenger and 2,395 for freight service), the company had 289 locomotives, 21 first-class, 37 second-class, and 15 third-class passenger cars, 2 chair cars, 7 emigrant, 8 dining, 16 sleeping, 6 business, 1 pay, 5 observation, 24 combination, 15 express, 17 baggage, and 7,500 freight cars. The net expenditure for equipment during the year was $1,604,916.37.

The total expenditure under the head of improvements and betterments during the year was $2,013,966.61, viz.: new buildings and grounds, water stations, stock yards, coal bunkers, new tools and machinery, etc., $861,706.38; road bed, $158,696.09; cost of steel rails over iron, $581,833.34; new side track and turn-tables, $156,776.79; new bridges and trestles, $1,213.85; new fences, $10,236.68; new telegraph line, $10,538.32; tree planting, $21,354.01; east approach to Bismarck bridge, $4,573.25.

It will be seen that a large item in this account is for replacing with steel the iron rails on the older divisions of the road. The mileage of track thus relaid with steel during the year was as follows: St. Paul division, 54½ miles; Minnesota division, 61½ miles; Dakota division, 68¼ miles; Missouri division, 22 miles—total, 206¼ miles. In addition, 28 miles of side track were built, 53½ miles of road ballasted, 153 bridges and 27 buildings rebuilt, 18 buildings enlarged, and 8 new stock yards constructed. The expenditures at Tacoma for coal bunkers, shops, wharf and other improvements were $237,372.91.

Coal of excellent quality has been discovered in the Bull mountains, about 30 miles north of Billings, Montana. Actual tests with this coal in locomotives show that four tons are the equivalent of three tons of the best Pittsburgh coal, burned under like conditions. The veins are 14 to 24 feet thick, and are estimated to underlie 25 square miles, and should yield 10,000,000 tons to the square

mile. The deposits of coal are found just where it is most needed for the economical operation of the road. It can be put upon the cars at $1 per ton, and delivered on the main line at a cost of $1.50 per ton.

At the commencement of the fiscal year 1882-'83 the ends of the track on the main line were 564 miles apart. They were advanced during the year: from the east 293½ miles, and from the west 166½ miles—a total of 450 miles; to which add 307 miles of track laid on branch lines—making the grand total for the fiscal year 757 miles. Since the close of the year, and up to September 15, 1883, 284 miles of additional track (including the 114 miles of main line, which were completed on the 22d of August), have been laid on the main line and branches, making 1,041 miles for the period beginning July 1, 1882, and ending September 15, 1883.

The amount expended for construction during the year ending June 30, 1883, was $19,422,720.07; to which add amount previously expended (from March, 1879, to June 30, 1882), $28,949,302.28—making the total amount to the close of the last fiscal year, $48,372,022.35.

Referring to the tributary or branch lines, the report says that the track has been laid on the Seattle Branch to a point about 25 miles from Tacoma and 15 miles from the junction with the Cascade Branch. Grading is well advanced on the remainder of the line, and it is expected that the track will all be down before the winter season begins.

The line of the National Park Branch was located in October, 1882. It leaves the main line at Livingston, and runs up the Yellowstone River to the northern boundary of the National Park, a distance of 51 miles. The work was commenced last spring, and was completed in August.

Track was laid on the Palouse Branch, prior to the end of the fiscal year, from Palouse Junction eastward, a distance of 32 miles. It has since progressed a further distance of 60 miles, The road will soon be opened as far as Colfax, and will be completed in 1884.

At the commencement of the fiscal year, 55 miles of track had been laid on the Little Falls and Dakota Railroad. During the year the line to Morris, 87¼ miles, was completed and put in operation.

Track laying on the Northern Pacific, Fergus and Black Hills Railroad has now reached a point 40 miles west of Breckenridge. About 2½ miles of additional grading is ready for the rails, and the track will soon be put down, thus reaching the terminus at Milnor, 117 miles from Waldena.

The Fargo and Southwestern Railroad has been completed to its terminus at La Moure, on the James River, a distance of 87½ miles from Fargo.

The Jamestown and Northern Railroad leaves the main line one mile west of Jamestown, and runs in a northerly direction 95 miles to the west end of Devil's Lake. Track laying began in August, 1882, and had progressed as far as Carrington, 42 miles, at the beginning of winter. The grading is nearly completed to the Lake, and the track will soon be laid. A survey has been made for an extension of the line to the Dominion boundary. A line from Carrington northwesterly to the Mouse River has also been surveyed. A short spur, called the Sykeston Branch, was located from Carrington to the west line of Foster county in May, 1883, and the track was completed to Sykeston, 13 miles, on the 1st of September.

From the report of the Land Commissioner it appears that there were sold during the year ending June 30, 1883, 761,236.24 acres and town lots for $3,392,831.78. The average price per acre was $4.02, against $3.26 during the previous year.

GENERAL REVENUE AND INCOME ACCOUNT.

Balance July 1, 1882		$3,039,923 49
Received from earnings	$7,855,459 26	
Received from Land Department	1,511,316 14	
Received from miscellaneous	12,249 00	
		9,379,024 40
Received from proceeds of bonds	$18,500,000 00	
Received from preferred stock sold	757,169 86	
		19,257,169 86
Received from loans for construction		5,452,081 56
Total		$37,128,199 51
Expended for operating expenses		$4,953,056 82
Expended for rentals and taxes		383,862 95
Expended for interest	$1,209,837 53	
Expended for int'st accrued on dividend scrip	139,224 63	
		1,349,062 16
Expended for preferred stock and bonds canceled		253,968 30
Expended for Land Department expenses and surplus for retirement of bonds		1,257,347 84
Expended for construction	$16,370,905 81	
Expended for new equipment	1,604,916 37	
Expended for improvements and betterments on old road	2,013,966 61	
Expended for material	247,281 16	
Expended for interest	604,918 76	
		20,841,988 71
Expended for advances repaid		4,593,946 08
Cash reserved for interest, uncalled for and accruing		2,275,651 96
Cash in hands of treasurer and disbursing officers		1,219,304 75
Total, as above		$37,128,199 51

CONDENSED BALANCE SHEET, JUNE 30, 1883.

Railroad, equipment and lands		$149,693,519 80
Cash in hands of treasurer applicable only to retirement of bonds		486,386 01
Northern Pacific R. R. Co's stock and other investments	$3,424,534 05	
General supplies on hand, including construction material	4,506,341 05	
Accounts receivable	2,573,058 38	
Cash in hands of treasurer	3,375,398 36	
		13,879,331 84
Total		$164,059,237 65
Capital stock:		
Common		$49,000,000 00
Preferred	$51,000,000 00	
Less canceled by land sales	9,250,536 10	
		41,749,463 90
		$90,749,463 90
Funded debt:		
Missouri division bonds	$2,500,000	
Less canceled	111,400	
	$2,388,600 00	
Pend d'Oreille division bonds	$4,500,000	
Less canceled	997,400	
	3,502,600 00	
General first mortgage bonds	33,361,000 00	
		39,522,200 00
Bills payable and advances on general mortgage bonds		7,662,501 92
Matured payments on contracts		2,600,600 89
Loans for construction purposes		5,452,081 76
Interest accrued to date	$1,092,158 63	
Coupons not presented	6,741 50	
		1,098,900 13
Net proceeds of land sales in preferred stock, bonds and cash		11,183,084 73
Dividend scrip		4,640,821 20
Profit and loss		1,149,583 12
Total, as above		$164,059,237 65

President.—HENRY VILLARD.

Vice-President.—THOMAS F. OAKES.

Second Vice-President.—ANTHONY J. THOMAS.

Directors.—Frederick Billings, Ashbel H. Barney, John W. Ellis, Rosewell G. Rolston, Robert Harris, Thomas F. Oakes, J. Pierpont Morgan, Henry Villard, August Belmont, New York; J. L. Stackpole, Benjamin P. Cheney,

Boston; John C. Bullitt, Philadelphia; Henry E. Johnston, Baltimore.

Secretary.—SAMUEL WILKESON.

Treasurer.—R. LENOX BELKNAP.

Land Commissioner.—C. B. LAMBORN.

Engineer-in-Chief.—ADNA ANDERSON.

General Manager.—HERMAN HAUPT.

Our English Letter.

WRITTEN SPECIALLY FOR THE AMERICAN RAILROAD JOURNAL.

PROBABLY not a few of your readers have visited Southport, in Lancashire, distant only a few miles from Liverpool, and a town one does well to see and better to live at for a time during the summer months. It is a resort not ranking with the best, but able to boast of many pretty houses, good streets, with pretty gardens fronting the houses, a fine hotel or two, a magnificent aquarium, splendid pier and other features, which render it desirable as a temporary place of residence. Its present claim to prominence rests upon the meetings of the British Association, which learned body assembled for its meeting of 1883, in the town aforesaid, September 19. Approaching twenty-three hundred tickets were sold before the office was closed on that day, and the figures afterwards reached 2,696. Two of the papers read at the meetings of the Association are of special interest to your readers, but the first of these is so certain to attract your editorial attention, that I need scarcely do more than mention it, as you are sure to publish at least a condensed report of it. I refer to a "deliverance" by Mr. James Brunlees, president of the Mechanical Section, in which he described the growth of mechanical appliances for the construction and management of railways and docks. The learned speaker having said that the railway of the present day is in principle what it was at the outset, proceeded to express the difference in detail between now and then, by the use of a simile which, as you may be sure, did not fail to engage the closest attention of the ladies present. The railway of to-day, he said, differed in detail from that of the original railway as much as, or more than, the skewer which fastened the dresses of the ladies of Queen Elizabeth's time differed from the pin of the present day, or the carpets of this day from the rush-strewn floors of that. Speaking of the ladies reminds me that Mr. Brunlees paid a very high compliment to one of your fair American women in the course of his address, His words were: "Women now take their place regularly in the ranks of several scientific professions, and though they have not shown any desire to enter that of engineering, there has recently been an example of their capability in that direction. It has been publicly stated that Colonel Roebling, the distinguished engineer of the Brooklyn Suspension Bridge, which is one of the most remarkable works of the age, was assisted during a long illness in carrying out his work by the talent, industry, and energy of his wife, who acquired theoretical and practical knowledge enough to aid in seeing that her husband's design was properly carried out. This example is worthy of mention as honorable to the individual woman, to the energetic nation to which she belongs, and to the better half of the human race." I leave you to the task of informing your readers on the various matters of invention dealt with in order by the learned speaker, and will content myself with dismissing the meeting of the British Association in another line or two.

On the third day of its proceedings Mr. Trelawney Saunders introduced what proved to be a very lively discussion, by reading a paper on the project for connecting the Mediterranean with the Red Sea by a navigable canal through the Jordan Valley. He thought this scheme practicable, although very difficult, between the Dead Sea and the Akaba arm of the Red Sea. For 147 miles the channel would be an inland sea about ten miles wide, except that for eleven miles it would be three miles wide. The scheme, I need not say, is revived in consequence of the difficulties as to the Suez Canal, about which England and France were so excited of late. It received rough treatment from several able and animated speakers, one of whom insisted that the equilibrium of the earth's surface would be disturbed by introducing into the valley an enormous volume of water. While, perhaps, not agreeing altogether with the argument of the *Times* newspaper as to the total absurdity of the Jordan Canal Scheme, from the standpoint of business expediency, and being entirely non-committal on the Thunderer's position as to the irreverence, not to say wickedness, of changing the geography of the Holy Land, I must say that the idea of giving Mother Earth an unfilial tilt is to me a shock which I am vain enough to believe is shared by all well-regulated minds.

Great enthusiasm was evoked at a later meeting of the Association, when, after the recital by Mr. H. H. Johnson, of his visit to Stanley's stations on the Congo River, a letter was read from the explorer, written in his best vein, urging England to see to it that "neither French nor Portuguese, nor any other particular nation, should defraud her of her rights and privileges in Africa, in broad daylight."

The electric railway at Brighton, now a quarter of a mile long, will, probably, be extended the whole front of the town under the Esplanade wall, a distance of two miles, when cars will be run in both directions every ten minutes. To add to its value, the provision of an electric hoist is projected, conveying passengers up the face of the eastern wall, a height of sixty-two feet. The speed made on the line is five miles an hour up an incline of one in a hundred, and the return ten miles per hour. As many as sixteen adult persons, besides the driver, have been carried in the car now in use, which runs on a twenty-four inch gauge, and is lighted at night by a twenty-candle Swan lamp.

The newly-enacted Patent Bill is passing through a fire of criticism, but, with all its possible imperfections, will answer the intention of the government, to protect and encourage inventors, especially by the reduction of fees. That it does not go far enough may be conceded, but, I submit, this is a mistake on the right side. I am told that in your country a man can hardly "whittle" a stick without infringing on somebody's patent. For four pounds, instead of twenty-five, as under the old law, the inventor insures the protection of his device for the period of four years. If, after this period, he shall pay ten pounds each year for four years longer, protection is extended to him for that time, making eight years thus far. The fees for the next two years are an annual payment of fifteen pounds; and after the tenth to the end of the fourteenth

year, twenty pounds per year. Then the term of protection ceases.

While on the subject of patents, a new invention, patented by Messrs. Bennett & Rosher, of Church street, Chelsea, London, is remarkable. The patentees call it "The Cylindrical Compartment Safety Railway Carriage." It provides that in the place of the ordinary coach, there shall be placed on the ordinary wheeled bogie, cylindrical compartments, say three in number, disposed transversely, as are the compartments now in service. The object of this arrangement is that, in case of collision, its force shall be broken by the rising of the central cylinder, thus preventing the telescoping of the train. It is proposed to place one or more of these singular coaches at each end of the train. You perceive that the passengers riding in the cylindrical compartments will share in the honor of preventing possibly serious disaster by, in the first place, riding in a place shaped like a boiler, and, secondly, by heroically receiving the first shock of the colliding body in case of collision.

Colonel Beaumont, who once sat in the House of Commons as member for South Durham, is finding not less glorious distinction in the pursuit of engineering. His boring machine, now employed in the tunnels on the Mersey Railway, is making seven feet in eight hours. In chalk, the cutters excavate fifteen feet before being changed, and in the Mersey sandstone from three inches to eighteen inches without renewal. The gallant colonel promises that his new machine, now being built, will drive headings at the rate of eight yards in twenty-four hours without the use of explosives.

You will do wisely to make a note of a coming publication, "The Railway Companies Directory," to be distributed in December next, which will give a list of directors, officers, and agents of the railways of the United Kingdom, with capital, working expenses, and revenue, prices of stocks, dividends, mileage, and weekly traffic, and receipts during the past five years. It is being edited by Mr. Percy Lindley. The book will, doubtless, be of great value to railroad people everywhere.

H. A. L.

HARD ON THE CITY MAN.—Twenty-five years ago, says a writer in *Harper's*, few pedestrians really knew anything of this country (near Catskill village, New York), and a story is related of an ardent New Yorker who visited the region with an old Catskillian, and who was thoroughly enchanted by all he saw. The guide, though loving his rugged, beautiful native land, was rather bored by the visitor's enthusiasm, especially when he was forced to wait while nobly sounding verses rose to the tourist's lips. Finally he turned upon him with, "Come from New York, don't you sir?" "Yes," was the answer. "Wa'al I'd like t'know what *you'd* say if I went down thar and *gawked* around like you do up yere."

INSIDE a Canadian farm house inspected by a writer in *Harper's Monthly*, a vial of holy water with a sprig of spruce always hangs on the wall, and the wife before stepping into bed sprinkles the sheets with it. A Protestant husband who did not relish this benediction retired first one night with an umbrella, and raised it till the Catholic shower had passed.

TRADE NOTES.

THE Gilbert Car Manufacturing Company, of Troy, N. Y., has taken a contract for five hundred freight cars for the government railways of Chili, South America. They are to be fitted with the Westinghouse freight brake. One hundred and fifty of them are nearly ready to be shipped.

BOWERS, DURE & COMPANY shipped two first-class passenger cars and one postal and one baggage and express car to the Georgia Pacific railroad on the 9th inst.

THE heavy steel caps for the steel tower of the Michigan Central Railroad bridge over the Niagara River are being placed in position. There are four of these caps for each tower. They were cast by the Cambria Iron Company, and are said to be the largest steel castings ever made in this country.

THE Jackson & Sharp Company have just shipped three passenger cars to the Railway de Sabanilla y Maroto, of Alabama.

THE Pittsburgh Bessemer Steel Works, located at Homestead, were sold on the 16th inst. to Carnegie Bros. & Co., of the Edgar Thompson Steel Company. The basis of the sale is said to be $1,200,000.

THE Union Pacific railway company's land sales since January 1 last, have been 721,928 acres which sold for $2,647,592.

THE Harlan & Hollingsworth Company has been awarded the contract for building a state railway carriage and a sleeper for the President of the Argentine Confederation, and the Jackson & Sharp Company has received an order for the construction of three sleepers for His Excellency.

THE proprietors of the Detroit Steel Works and the Detroit Car Spring Company, No. 2 Moffat Building, Detroit, announce that they have on exhibition at their Chicago office, No. 103 Adams street, both spring steel and coil and elliptic springs of their own manufacture. Their representative at this address shows the above articles and tests of the same, and railroad men visiting Chicago are invited to call and see him.

WE commend attention to a pamphlet issued by the manufacturers of the Clayton Improved Air Compressors, the Clayton Steam Pump Works, Nos. 45 and 47 York street, Brooklyn, N. Y. It contains finely illustrated descriptions and a price list of the variety of compressors, suitable for many purposes, turned out at their shops. As our readers are aware, compressed air as a motor for working rock-drills and water-pumps in mines and tunnels, coal-cutting machines, under-ground hauling and hoisting engines, for driving mine locomotives, for sinking caissons for piers of bridges, for refrigerating purposes, for the pneumatic transmission of messages, etc., has come into general use. Its advantages over steam, when employed in a confined space, as in a mine or tunnel, together with the remarkable sanitary effect produced by its introduction, furnishing at all times a supply of pure, fresh air to the miners, have resulted in the fact that air-compressing machinery is now employed in many of the mines and on all of the great engineering works in this country where it can be effectually used. The Clayton Air Compressors are said to be especially well designed, and have been used for all of the above purposes.

Some Choice Military Recollections.

"RECOLLECTIONS of a Drummer-Boy," in the September *St. Nicholas*, contains several quotable passages. For example, the following: The chaplain, it should be said, made some pretension to literature, and considered himself quite an authority in the camp on all questions pertaining to orthography, etymology, syntax, and prosody, and presumed to be an umpire in all matters under discussion in the realm of letters. So, when he came into the sutler's tent, Captain K—— exclaimed: "Good evening, Chaplain, you're just the very man we want to see. We've been having a little discussion here, and as we saw you coming, we thought we'd submit the question to you for decision." "Well, gentlemen," said the chaplain, with a smile, "I shall be only too happy to render you what assistance I can. May I inquire what is the matter in dispute?" "It is but a little thing," replied the captain. "You would, I suppose, call it *more a matter of taste* than anything else. It concerns a question of emphasis, or rather, perhaps, of inflection, and it is this: Would you say, 'Gentlemen, will you have a cig-ár?' or 'Gentlemen, will you have a cig-àr?'" Pushing his hat forward, as he thoughtfully scratched his head, the chaplain, after a pause, responded: "Well, there doesn't seem to be much difference between the two. But I believe I should say, 'Gentlemen, will you have a cig-ár?'" "*Certainly!*" exclaimed they all, in full and hearty chorus, as they rushed up to the counter in a body, and each took a handful of cigars with a "Thank you, Chaplain!" leaving their literary umpire to pay the bill—which, for the credit of his cloth, I am told he did.

The writer's recollections of cooking in the army are amusing. He says: At first we tried a company cook; but we soon learned that the saying of Miles Standish—"If you want a thing to be well done, you must do it yourself; you must not leave it to others"—applied to cooking quite as well as to courting. We therefore soon dispensed with our cook, and though, when we took the field, scarcely any of us knew how to cook so much as a cup of coffee, a keen appetite, aided by that necessity which is ever the mother of invention, soon taught us how bean soup should be made, and hard-tack prepared. As I write, there lies before me on my table an innocent looking cracker, which I have faithfully preserved for years. It is about the size and has the appearance of an ordinary good biscuit. If you take it in your hand, you will find it somewhat heavier than an ordinary biscuit, and if you bite it—but no; I will not let you bite it, for I wish to see how long I can keep it. But if you were to reduce it to a fine powder, you would find that it would absorb a greater quantity of water than an equal weight of ordinary flour. You would also observe that it is very hard. This you may, perhaps, think is to be attributed to its great age. But if you imagine that its age is to be measured only by the years which have elapsed since the war, you are greatly mistaken; for there was a common belief among the boys that our hard-tack had been baked long before the commencement of the Christian era! This opinion was based upon the fact that the letters B. C. were stamped on many, if not, indeed, all of the cracker boxes. To be sure, there were some skeptics who shook their heads, and maintained that these mysterious letters were the initials of the name of some army contractor or inspector of supplies, but the belief was wide-spread and deep-seated that they were certainly intended to set forth the era in which our bread had been baked.

Slovenly Reading.

WE must warn all men, old and young, against an evil thing which has been described as the "prevailing pestilence of slovenly reading." This pestilence has lain low many a one who began life with excellent prospects. It is ruinous both to mind and morals. It is apt even to injure a man's business habits, and prevent him from winning success in practical affairs. In time it will confound all his faculties. It will destroy his capacity for clear perception, for precise thought and for proper reasoning. It will throw into confusion his judgment and his memory. If he does not get rid of it he can never become a good writer, or do any literary work of any kind worth looking at. How many slovenly readers are to be found in these times. They will, in their slovenly fashion, read a newspaper article, perhaps a very excellent one, and when they have got to the end of it, or, as they say, when they have "looked through it" or "glanced over it," you will find that they are unable to give any accurate account of its argument, or that they do not apprehend its fundamental points, or that they have lost one of its links, or that they have overlooked an important illustration, or that they have failed to seize a word which is the very hinge of the writer's thought, or that they have wholly misunderstood the drift and purpose of the article which they have wasted their time in glancing over. These slovenly readers are an affliction to careful and correct writers. When such a writer sees how his reasoning and his language are distorted by them, his mind is apt to become ruffled, and every one knows how a ruffled mind unfits a man for the work of perspicacious composition. We are of the opinion that the prevailing pestilence of slovenly reading is largely due to the slovenly way in which children are taught to read at school. Teachers must be very careful about this thing; they must teach their scholars to read with precision and understanding, thinking of every word, getting the sense of each sentence, and grasping the full meaning of any piece that may be before them.—*New York Sun.*

Paint for Floors.

A PAINT for floors, which economizes the use of oil colors and varnish, is described in the German technical press as having been devised by Herr Mareck. It is remarked that this paint can also be used on wood, stone, etc. For flooring, the following mixture has been found applicable: Two and one-eighth ounces of good, clear, joiner's glue is soaked over night in cold water. It is dissolved, and then is added (being constantly stirred) to thickish milk of lime heated to boiling point, and prepared from one pound quicklime. Into boiling lime is poured (the stirring being continued) as much linseed oil as becomes united by means of saponification with the lime, and when the oil no longer mixes there is no more poured in.

If there happens to be too much oil added, it must be combined by the addition of some fresh lime paste. For the quantity of lime previously indicated, about half a

pound of oil is required. After this white, thickish foundation paint has cooled, a color is added which is not affected by lime, and in case of need the paint is diluted with water, or by the addition of a mixture of lime water with some linseed oil. For yellowish-brown or brownish-red shades, about a fourth part of the entire bulk is added of a brown solution obtained by boiling shellac and borax with water. This mixture is specially adapted for painting floors. The paint should be applied uniformly, and is described as covering the floor most effectually, and uniting with it in a durable manner. But it is remarked that it is not suitable for being used in cases where a room is in constant use, as under such circumstances it would probably have to be renewed in some places every three months. The most durable floor paint is said to be that composed of linseed oil varnish, which only requires to be renewed every six or twelve months. It penetrates into the wood and makes it water resisting; its properties being thus of a nature to compensate for its higher cost in proportion to other compositions used for a similar purpose. Its use is particularly recommended in schools and work rooms, as it lessens dust and facilitates the cleaning of the boards.—*The Builder.*

THE JOURNAL has received a circular letter from the Chicago and Alton Railroad Company, under date of Oct. 1st, and issued by the General Freight Agent, Mr. H. H. Courtwright, announcing that Mr. S. H. Fulton has been appointed General Eastern Freight Agent, vice L. Fowler, resigned—to take effect immediately. Their New York office is No. 338 Broadway, which is a central location, and in the so-called "railroad district."

Mr. Fulton has been connected with the railroad business for many years, and until recently was with the Erie and Pacific Despatch, stationed at Chicago.

The Chicago and Alton represents about 1,000 miles of road, whose three chief points are Chicago, St. Louis, and Kansas City. The natural advantages which accrue to it from covering such a rich and flourishing section, are greatly enhanced by a wise, enterprising and liberal management. Its facilities for the passenger traffic are ample, and the travelers over it are sure of good accommodation, and what is of even yet greater importance, schedule time. The Pullman palace sleeping cars and the palace reclining chairs are run by them.

The freight department also shares in the general excellence observable on this road, and offers to shippers an unexcelled service for safety, speed and close attention to and watchfulness of their interests.

EAST of Cresson (in the Alleghanies) a profound ravine breaks its way wildly from the heart of the mountain to the lower valleys. It has acquired the name of Allegrippus, from an engine which fell over a fifty-foot embankment there thirty years since. The driver was Thomas Ridley, who still commands one of the Pennsylvania's locomotives. During the riots of 1877 an attempt was made to capture his engine, but he particularly insisted on running it without the aid of the mob, and it happened soon afterward that the company presented him with a gold watch and chain.—*Harper's.*

Growth of Railroad and Dock Appliances.

AT the recent meeting of the British Association, held at Southport, Lancashire, Mr. James Brunlees, F. R. S. E., read an address on the growth of mechanical appliances for the construction and working of railways and docks. We give a summary of the paper, clipped from *Engineering*.

The railway of the present day, Mr. Brunlees said, was in principle much as it was at the outset, but it differed in detail from the original railway as much or more than the skewer which fastened the dresses of the ladies of Queen Elizabeth's time, did from the pin of the present day. First the iron tram-plate had been superseded by the flanged rail, and to this had succeeded the smooth rail and flanged wheel. It had taken a long time to settle the form of the rail, and even now there was great diversity of pattern. As traffic increased, efforts were made to harden the surface of rails, and a system of steel plating for points and crossings was introduced in 1854 by a Mr. Dodds. In May, 1862, steel rails were laid down experimentally at Chalk Farm, and after outlasting sixteen lengths of iron rails, were taken out in August, 1865, after having been worn away only one-quarter of an inch on one side only. In 1866 the London and North-Western Railway had in use 3,009 tons of steel-headed rails, and fifty miles of steel rails. It was observed in 1876 that if, in order to fully realize the effect of the enduring quality of steel rails, it was necessary to take a given section of the busiest portion of one of our leading railways, over which upwards of 700,000,000 tons of live and dead weight pass annually, it would be found that the life of a steel rail on that portion of the line would be forty-two years if the traffic remained the same. This would reduce the cost of maintaining the permanent way of railways from 210*l.* to 106*l.* per m le. When it is considered that such a saving on a system of 500 miles, which at 25,000*l.* a mile costs twelve and a half millions, is 52,000*l.* a year, or about a half per cent. of the cost of the railway, it will be seen that, besides some increase of dividend to shareholders, no inconsiderable sum may be, and has been, devoted by the railway systems of Great Britain to the comfort of travelers; out of the saving effected by the introduction of steel rails. Turning then to signals, the speaker said that they were commenced in 1838 on the Grand Junction Railway, by the employment of a disk, which could be turned face or edgewise to the track. Distant signals were first employed in 1846 in Scotland, and probably the first distant signals of the semaphore type were those of the Great Northern, which were made in 1852. Automatic signals were tried with considerable care on the Brighton line, but were abandoned owing to practical difficulties in their working. The first instance of concurrent action between signals and switches was at the Bricklayer's Arms Junction in 1843. At East Retford a simple contrivance for interlocking the switches was introduced in 1852, and Mr. Ransome considers this the germ of the elaborate apparatus now used. With regard to the important question of brakes, it did not force itself upon public attention until competition increased the size and speed of trains. Means were sought to add to the control of trains, first, by using the power of the steam acting directly on the brakes; secondly, by the connection of several of the old brakes, so as to unite them under

the control of a single brakeman; and thirdly, by the introduction of brake apparatus connected with the buffers, so as to make the momentum of the train itself available in generating a retarding force, a result which has not been realized in practice. Colonel Yolland reported to the Board of Trade, in 1858, the result of a series of trials with brakes designed on these principles. The application of the brake to the engine was an old device, which had been abandoned on account of the injury it caused to the engine. Mr. McConnell, whose engine brake was tried by Colonel Yolland, endeavored to remove this objection by applying blocks to the rail instead of to the wheels of the engine, the block being forced down on the rail by means of an elbow joint. The second principle, the connection of several brakes united under the control of one driver, was chiefly represented by the invention of Mr. Newall. In this system two or more carriages, or, if necessary, the whole train, were fitted up with brake blocks, all of which were brought under the control of one guard by means of a longitudinal shaft, which transferred the motion of the guard's wheel to the brakes, throughout the whole length of the train. This principle has been applied in all good brakes since invented, however actuated; and it appeared to be a sound principle for the application of the retarding force. The speaker did not intend to enter into the controversy as to the best system of brakes, but there were several which were more or less effectual, and whereas trains which thirty years ago weighed on the average 30 tons, with engines of the same weight, running at thirty-five miles an hour, could scarcely be brought to a stand in a distance of 800 to 1,000 yards, now trains of twice or three times that weight, running at a much higher speed, could be brought to absolute rest in 20 or 30 seconds, and within a distance of 300 to 400 yards. The early locomotives were only designed to work on comparatively level lines and thus involved long detours or heavy works. Where neither of these were practicable, some other method of haulage had to be adopted, either the wire rope system or the central rail system. The former was employed by the speaker at the San Paulo Railways, where the ascent of 2,500 ft. in five miles was accomplished by four inclined planes, each with a gradient of 1 in 9¾, and of an average length of a mile and a quarter.

At the top of each bank-head, with an incline of 1 in 75 downwards, a stationary engine is placed. The wagons are attached to each end of the rope, and are raised and lowered simultaneously. On the lower half of each incline an ordinary single line is laid, and on the upper half, above the passing place, three rails are laid forming a double road, with a center rail common to both. Exactly half-way on each incline the single line of the lower half, and the three rails of the upper half, branch into a double way of sufficient length for the trains to pass each other. Each incline has a winding engine of 150 horse-power, and the ropes are steel wire, and 4 in. in circumference. The center rail system was designed by Mr. Fell, and first practically carried out under the speaker's direction over Mont Cenis. This, he said, was probably the most economical way of working very steep gradients under ordinary circumstances, and it has been found to answer very well, wherever it was efficiently carried out. Improvements in the means of cutting and tunneling were next adverted to, and the Diamond rock drill, the Brunton machine, and the Beaumont machine, were briefly described, as well as the steam navvy. In the matter of pile-driving, the speaker had employed several different methods. In fine sands, as at the Southport pier, he had used a disk pile, lowered into the sand by its weight as fast as the sand was removed from under it by a jet of water, and in hard shale he had adopted corkscrew piles. A revolution in driving timber piles was brought about by Mr. Nasmyth, who adopted the principle of his steam hammer to the purpose. His pile-drivers, generally in use, weigh about 24 tons; the boiler weighs 76 cwt.; the hammer weighs about 30 cwt., and delivers a blow every second, driving the pile 5 ft. to 10 ft. per minute, in ordinary soil. Iron cylinders were first used for foundations by Mr. Redman, on the Thames, at Gravesend, in 1842, and the first practical application of compressed air to the sinking of cylinders appears to have been made in 1839 at Châlons. Lord Dundonald had previously patented the same system in this country, where it was applied in constructing Rochester Bridge. Next Mr. Brunlees related the history of the machinery used in connection with docks and shipping, and concluded with an allusion to the electric railway.

Income Bonds.

ONE effect of the present shrinkage in Wall street will be to put income bonds out of fashion. Until the recent boom came in, when anything in the shape of a railroad bond was sure to be taken at some price, such a thing as an income bond was a rarity; and when found was the sequel of some foreclosure suit, where mortgage creditors had been content to relinquish the whole or part of their liens, and to take what was virtually a redeemable stock without voting power—under the name of an income bond. But recently the projectors of new roads have taken to issuing income bonds for construction purposes as a sort of make-weight, much like a chromo held up as as bait to lure capital. For example, the Central Ohio Railroad offered, for $600 cash, $1,000 first mortgage and $300 income bonds; and there are lots of income bonds on the stock list which have never had any equivalent in money paid in. It is noticeable that these are issued by new kite-flying financiers. The old conservative railroad men steer clear of such devices—they stick to stock or good mortgage bonds as resources for building.

WE clip the following amusing article from "An unpublished chapter of Hawaiian History," published in the September *Harper's*. The writer had been engaged with others in preparing a document for presentation at the Foreign Office of the British government: "An amusing dilemma embarrassed us verdant diplomatists at the outset of our proceedings. As I had now, according to my instructions, become associated with Messrs. Richards and Haalileo, the dispatches were to be signed by all three of us. We pondered long over the momentous question as to how the Earl of Aberdeen should be addressed in them. The ordinary phrase 'My lord' seemed *singular* for a *plural* signature. The native chief suggested that '*Our* lord' would be proper. Our missionary associate thought that savored of irreverence. Another proposed '*O* lord,' which was open to the same objection. We finally surmounted the difficulty by considering that our three signatures together meant Kamehameha III., and began it 'My lord,' which passed muster with our Hudson Bay House censor."

Tramway.

[*The English nomenclature of "Tramway" is adopted in this department as being of greater convenience and more specific in its meaning than "street railway," though in alluding to individual organizations we shall preserve their corporate titles. It is our hope to nationalize the term Tramway, which is now generally used in every English-speaking territory with the exception of the United States.*]

THE CONVENTION.

IN another place we give a report of the first Annual Convention of the American Street Railway Association, which contains matter of great value to all persons practically interested in the business of providing cheap and comfortable means of city travel. Readers are respectfully referred to said report, which evidences that while on some points of importance, leading street railroad men are at variance, they are certainly a unit in the appreciation and enjoyment of the means to valuable coöperation afforded by the Association. The late convention was, in every sense, a success. It was a demonstration of the value of interchange of opinion, of the presentation and discussion of numerous experiences in street railroad management, and of opportunities to form friendly acquaintance between gentlemen of the same line of pursuit, which is desirable not only for the pleasure and recreation it affords, but for results of great practical importance in the conduct of business and ultimately to the public at large.

The formation of the Association, now entered upon its second year of hopeful life, elicited in these pages expressions of approval and cordial good-will, which initiated relations of a pleasant character between the JOURNAL and prominent street railroad men, and thus led to the enlargement of that department in our columns which is appropriated to matters coming directly within the scope of their interests. Antecedently to the birth of this organization, whose first annual convention is now numbered among the most interesting chapters of national progress, the editorial management of the AMERICAN RAILROAD JOURNAL had begun a policy entirely new in this country; namely, presenting side by side with information on the general railway system of the United States and Canada, and in its proper place as a distinct and exclusive department, such current news and comment on matters pertaining to street railroads, as diligence and enterprise could collect. The experiment thus early made was, as we have suggested, encouraged by the formation of the American Street Railroad Association; and its value and interest have so happily increased with time, that a very considerable and enlarging space in every succeeding issue of this periodical has been occupied with what our British cousins call "tramway" intelligence. In short, the department has grown with the Association, and the very encouraging outlook of the one means to us the certain expansion of the other.

This timely statement of an obligation to continually improve the street-railroad department, leads naturally to the acknowledgment of many encouraging words concerning it addressed to us by letter and otherwise, accompanied in some cases by expressions of approval taking the more substantial form of news, subscriptions and advertisements for insertion. In these ways, the experiment of a street railroad department, undertaken when such a feature of journalism was unknown, has developed into an "institution" of liberal dimensions and strength, and able to both promise and perform. At the same time this paragraph would be incomplete did we hesitate to invite the attention of street railroad companies and their responsible officers, to the great value of the JOURNAL to them, for its news, its letters, its accounts of inventions, its advertisements, and, possibly, its editorial opinion. It is largely devoted to their interests, and the reasonable expectation of their coöperation with us in the enlarging and strengthening of the street railroad department of the AMERICAN RAILROAD JOURNAL, is surely one which cannot be disappointed.

A PROMINENT officer of a street railroad in St. Louis writes to us of the AMERICAN RAILROAD JOURNAL, thus encouragingly: "All street railway companies should subscribe for such a journal for their own good; and it is a sleepy manager who fails to see where he can invest three dollars more profitably. Why your suggestion on rail joints and chair plates alone, in a previous issue, demonstrates the fact that you are alive to their interests." Of course we are, and better evidence of this fact is to be found in the present than in any past issue. Our arrangements for the future include a still more considerable augmentation of the strength of this department. The coöperation of the street-car companies, not yet so general as it will become, is respectfully acknowledged.

THE old discouraging conundrum, "Who will watch the watchman?" is clothed with fresh significance by a circumstance which happened in Brooklyn, recently. A conductor on one of the cars was arrested for crooked practices, and upon his person were found *two* of those metallic guardians of the conscience known as the bell-punch. It seems that this ingenious if not ingenuous gentleman was accustomed to ring first one of the punches and then the other—that being his idea of a fair divide. The result of course was that the punch which he reserved for the examination of the company called for only half as many fares as he had received. It remains for some gifted inventor to invent something that will prevent the duplication of the bell punch.

The Cable-Car System.

PROFESSOR E. T. COX read a paper on this system before the meeting of the American Association for the Advancement of Science, held recently at Minneapolis. His paper concludes in the following words, which remind us once more that "doctors differ."

"Mr. Moody Merrill, chairman of the Horse Railroad Convention held at Boston last March, says: 'There are in the United States and Canada, 415 street railways, giving employment to about 85,000 men; 18,000 cars and 100,000 horses in daily use. These horses consume 150,000 tons of hay and 111,000,000 bushels of grain. Their 3,000 miles of track represents an invested capital of $150,000,000. The number of passengers carried is 1,212,460,000 annually.'

"In the city of New York there are 110 miles of horse railway, and 11,866 horses are used to operate them. The horses, together with their harness, expensive lands and stables, feed and grooms, make the operating expenses $5,104,596.79 per annum. The average life of the street car horse in New York is less than three years. This terrible abuse of animal life should enlist the public sympathy, and commend at once a system which dispenses with the use of horses where they are so fearfully overworked.

"The present horse railways may readily be adapted to the cable system without serious interference with their travel. It simply requires the making of a trench in the center of the road, in which to place a tube through which the cable is to run.

"That eminent authority on economies in railroad passenger and freight traffic, S. F. Pierson, who is the assistant pool commissioner of the trunk lines from the Atlantic seaboard to the West, shows from official tables that the horse railroads of New York City, which have cost, including equipment and real estate, a trifle less than $23,000,000, carried in the year 1881 154,000,000 passengers, at a cost of 3 61-100 cents for each passenger, while if the cable system had been employed instead of horse cars, the cost of carrying each passenger would have been but 1 46-100 cents for each passenger; a saving of 2 15-100 cents per passenger, or $3,317,000 yearly, a sum equal to the interest at 6 per cent. on $56,000,000. Calculated on the same basis, the saving in Brooklyn would represent a capital of over $30,000,000. A saving of two cents per passenger carried on all the horse cars of the United States and Canada would amount to $24,249,200 yearly, a sum equal to the interest at 6 per cent. on $400,000,000.

"Gen. W. Sewell, United States Senator, of New Jersey, a practical railroad engineer, and of the management of the Pennsylvania Railroad Company, who has personally investigated the cable system, both in San Francisco and Chicago, says 'that within ten years the cable system will supersede the horse cars on every considerable street railway line.'

"The cost of constructing a cable car railway double-track line is between $70,000 and $80,000 per mile; but it is shown that the great economy of the system over the horse cars most fully compensates for this increase.

"Mr. Hallidie (who introduced the system in San Francisco) has disposed of his patents for England, and the system will soon be in extended operation on the other side of the Atlantic. The patents for the United States have been purchased by a syndicate in New York City, and they are preparing to have the cable roads introduced into all the principal cities and towns throughout the country."

The Philadelphia Cable Road.

THE friendly criticism subjoined is accompanied with valuable information. We accordingly print it with pleasure:

ROOM NO. 4, NEVADA BLOCK,
SAN FRANCISCO, SEPTEMBER 7, 1883.

Editor American Railroad Journal, No. 245 Broadway, N. Y.

DEAR SIR:—In your journal of August 1 appears an article entitled "The Street Railroad Problem," referring with more than ordinary intelligence to the various experiments heretofore tried for the purpose of propelling street cars without the use of horses. I desire, however, to call your attention to one error of some importance to the general public.

After referring to the cable roads in San Francisco and Chicago, you speak of the Brooklyn Bridge cable railroad, and then you say: "Why said experiment is a solitary one east of Chicago is something we wish to know," etc.

The facts are that the Union Pass. Railroad Company, of Philadelphia, have constructed a cable road on Columbia Avenue in that city, and have been successfully operating the same since the first day of April of this year, carrying from 15 to 25,000 passengers daily. This cable is a little over 10,000 feet in length, runs out of Columbia Avenue to the Park, where it makes a complete curve between the curbstones of the street, and returns. The car is carried clear round without releasing the grip from the cable, or inconvenience to the passengers in the slightest degree, a fact not before attained by any cable car. The cars are run without the cumbersome and expensive dummy in use by the old system in San Francisco and Chicago, the grip attachment being under the ordinary street car, and operated by the grip-man who stands on the front platform, an arrangement superior to any in use west of Philadelphia, very much cheaper and more simple to operate. An evidence of this is the fact that during five months of constant use with crowded cars not a single accident has occurred either to passenger, spectator or employé, or anybody or thing. It is perhaps due to this fact, in a measure, that you were not aware of there being any such road, as all other cable roads have obtained a notoriety for the killing and maiming of several monthly. The Philadelphia cable road is operated under the system patented by myself, and known as the Philadelphia system. Very respectfully yours,

JOEL B. LOW.

An Old Car Grip.

PUBLIC interest in cable traction on the Brooklyn Bridge is maintained by the vexatious delays and disappointments attending the experiment there. Apropos of this matter, "Civil Engineer" writes to the New York *Times* as follows: "I think Colonel Paine would be saving a great deal of money and more valuable time, if he were simply to adopt the plan of grip that was used for years with every success on the Blackwall Railway in London, England, before the introduction of the modern locomotive. This line of railway ran from Fenchurch street Station, London, to Blackwall, a distance of some miles, and was entirely operated by a traction rope which was gripped and let loose as the stations (of which there were several) were approached or left. There were always many cars at intervals on both the up and down tracks, and the line was operated precisely as the line of railway on the Brooklyn Bridge, by a stationary engine at either end. I have traveled dozens of times by this railway, and on no occasion was there the slightest hitch or delay; consequently I feel justified in recommending the adoption of the grip there in use. The last time I traveled with the 'traction' on said line was in 1847—thirty-six years ago—in which year, I think, the more powerful modern locomotive was substituted for the traction rope."

First Annual Convention of the American Street Railway Association.

THE first Annual Convention of the American Street Railway Association was opened at Chicago on the ninth of October, 1883. It proved to be a highly interesting occasion, and the Association begins its second year with a membership of about sixty.

Mr. H. H. Littell, general manager of the Louisville City Railway Company, of Louisville, Ky., President of the Association, was present, also the following official members: First Vice-President, W. H. Hazzard, President Brooklyn City Railroad Company; second Vice-President, C. A. Richards, President Metropolitan Railway Company, Boston; third Vice-President, G. B. Kerper, President Mt. Adams and Eden Park Inclined Railroad Company, Cincinnati; Secretary and Treasurer, W. J. Richardson, Secretary Atlantic Avenue Railroad Company, Brooklyn. There were also present the following members of the Association:

Thomas Lowry, President, Jacob Sharp, Vice-President, C. C. Goodrich, Secretary Taunton St. Ry. Co., Taunton, Mass; Moody Merrill, President, Julius E. Rugg, Superintendent Highland St. Ry. Co., Boston, Mass.; Amos F. Breed, President Lynn & Boston R. R Co., Boston, Mass.; H. R. Harding, Secretary Metropolitan R. R. Co., Boston, Mass.; William H. Hazzard, President Brooklyn City R. R. Co., Brooklyn, N. Y.; William A. Morrison, Superintendent Bushwick R. R. Co., Brooklyn, N. Y.; Walter A. Jones, Vice-President New Williamsburg & Flatbush Ry. Co., Brooklyn, N. Y.; Samuel S. Spaulding, President Buffalo, East Side St. Ry. Co., Buffalo, N. Y.; Jacob Rehm, Vice-President North Chicago City Ry. Co., Chicago, Ill.; Henry M. Watson, President Buffalo St. Ry. Co., Buffalo, N. Y.; Charles Hathaway President Superior St. Ry. Co., Cleveland, O.; John H. Bonn, President North Hudson R. R. Co., Hoboken, New Jersey; Thomas Lowry, President, H. M. Littell, Superintendent Minneapolis St. R. R. Co., Minneapolis, Minn.; C. C. Woodworth, Secretary Rochester City & Brighton Ry. Co., Rochester, N. Y.; L. Brayton, President, D. F. Longstreet, Treasurer Union R. R. Co., Providence, R. I.; Charles Cleminshaw, Vice-President Troy & Lansingburgh R. R. Co., Troy, N. Y.; J. R. Jones, President, James K. Lake, Superintendent Chicago W. Div. Ry. Co., Chicago, Ill.; John G. Holmes, President Citizens' P. R. Co., Pittsburgh, Pa.; D. F. Longstreet, Denver City Ry. Co., Denver, Col.

President Littell called the meeting to order, and introduced its business with a review of the history of the Association, concluding with an encouraging statement as to its future.

The gentlemen whose names are subjoined were admitted to membership:

C. B. Holmes, president and superintendent Chicago City Ry., Chicago; W. Elson, superintendent Cedar Rapids & Marion St. Ry., Cedar Rapids, Ia.; W. W. Ward, superintendent and assistant treasurer New Haven & West Haven Horse R. R. Co., New Haven, Conn.; C. S. Goodrich, president Hartford & Weathersfield Horse Ry. Co., Hartford, Conn.; D. W. Stroud, president and manager Citizens' St. R. R. Co., Springfield, O.; F. G. Fish, president, C. Hathaway, vice president and manager Belle City St. Ry. Co., Racine, Wis.; Wm. C. Lange, manager, A. F. Mason, superintendent South St. Louis Ry. Co.; James H. Anderson, president, R. J. Anderson, secretary Keokuk St. Ry. Co., Keokuk, Ia.; T. J. Minary, vice president Central Pas. Ry. Co., Louisville, Ky.; P. C. Maffitt, president Missouri R. R. Co., St. Louis, Mo.; John H. Maxan, president Lindell Ry. Co., St. Louis, Mo.; Charles Parsons, president, Robert McCulloch, secretary Benton-Bellefontaine, Ry. Co., St. Louis, Mo.; Charles J. Harrah, Jr., vice president, Wm. Hagensweiler, general manager Peoples' Pas. Ry. Co., Philadelphia, Pa.

Secretary Richardson's report, which was received with hearty pleasure and approval, reviewed the work done by the Association since its inception. It commended the system of reports by committees, congratulated the Association on its encouraging and enlarging membership, and the interest evinced in its operations by street railway men generally, gave an account of the steps the Secretary had adopted to procure information as to the taxation of street railways in the United States and Canada, and announced that fifty-five companies had forwarded to him copies of their rules and regulations, These, Mr. Richardson hoped, would be made to serve as the foundation of uniform arrangements on the part of companies connected with the Association, as far as practicable, The report was adopted, also that of the Executive Committee, and that of Mr. Richardson, the treasurer.

The Report on Track Construction was as follows:

REPORT ON TRACK CONSTRUCTION.

To the President and Members of the American Street Railway Association:

GENTLEMEN: In the construction of street railroads certain interests have to be considered, one of the most important of these being the legal rights of the public. It is unnecessary to detail what those rights are, as our law-makers have fully attended to that part of the business, and do not hesitate to remind us of the fact, if we violate any of the provisions of the law laid down by them.

Your committee do not propose to go into and discuss the different methods of constructing tracks, as they are fully aware of the fact that the gentlemen present are all well acquainted with the different styles, and it is for them to decide as to the amount they would invest in a track, the style and durability of same being dependent on the amount invested.

As the population of a locality increases, the necessity for a convenient mode of transit from place to place becomes apparent, and this want is best supplied by the construction of a street railroad, under such municipal restriction that the rights of all are protected.

Nothing tends to develop any particular locality so much as a well-conducted street railroad. Along the course of its track will at all times be heard the sound of the hammer, indicating the erection of new domiciles, the builders of the same being drawn hither by the superior inducements offered for speedy and cheap transit.

The street railroad may well be called "the poor man's carriage." Under judicious and economical management the rate of fare should be such that the burden will be light on the public, at the same time making the construction of a street railroad a paying institution, thus encouraging enterprise in that direction. And in order that this may be accomplished, the best method of construction should be adopted, varying in different localities according to the nature of the traffic, present and prospective, on the contemplated route. The construction of street railroads should be such that other modes of traveling should in no case be interfered with, bearing in mind the fact that the rights of others should be respected in the same ratio that the rights of a street railroad corporation are maintained. Hence it is necessary that the greatest attention should be given to the full and complete repair of a track, quoting the old adage, that "a stitch in time saves nine," so may many a dollar be saved to a street railroad corporation by close watchfulness of a road-bed. A poor track and imperfect road-bed means decreased travel by that route, and loss to the company.

The public are tenacious where their rights are concerned. The jumping of a track by a car, and the consequent jolting occasioned thereby, tend to disgust shaken and demoralized travelers, and, with anathemas heaped on the head of the railroad corporation, they leap from the car and wend their way to business by their own private conveyance, namely, their legs. Hence the necessity of having good and solid road-beds, with rails equidistant from each other the whole length of the track. Further, the rails should be so laid that the least possible elevation above the road-bed and the road on each side of the track should exist. At the same time, great care should be taken that the paving should not be elevated above the rails, and that the cross-walks should be kept well down, for the reason that an elevated pavement or cross-walk causes the mud and ice to accumulate in the track, and prevents the proper use of the snow-plow in winter in keeping the track clear of snow. Should there be a great elevation of the rails, the railroad corporation is interfering with the rights of others by obstructing travel, and in some cases may have damages to pay by the breaking down and destroying of other people's vehicles. This is invariably the undesirable termination of neglect and carelessness in construction.

Every railroad operator has his own peculiar ideas as to the best methods of constructing a street railroad; and it seems to be a law of nature that every man should be wedded intimately to his own peculiar views, and sometimes with the fallacy of his views staring him in the face, he still blunders on,

> "For a man convinced against his will
> Is of the same opinion still,"

and in giving our views as to the construction of a street railroad, in the face of so many who have had as extended an experience as ourselves, we do not wish to appear egotistical. There are many points which have to be considered. And a very important one that must be well weighed, is the nature and extent of the travel along the route through which the road is to be constructed. If the travel is great it shows the necessity of a solid and well ballasted road-bed—a road-bed that will stand the crushing and

pressure from the forces applied on the outside of the track, and from between the tracks by the constant tramp, tramp of the horses in the drawing of the loaded cars. We should, therefore, recommend, for a good and well ballasted road-bed, good gravel, gravel that will bind; and if this cannot be procured, sand, or any other ballasting material that will cause the least rot to the timbers by allowing the water to filter through. The paving well and properly laid on this bed cannot fail to give satisfaction. When the traffic is very heavy, we should recommend heavy tram rail, from 40 to 45 pounds to the yard, and well spiked to stringers with good cast or wrought iron joint plates at the end of the rails.

We do not think we have advancod very much in the construction of street railroads. There is still room for great improvement. And one of the causes of this lack of advancement arises from the fact that the promoters of new lines desire it done as cheaply as possible, and, in the long run, with little satisfaction to themselves. A cheap street railroad may work well and give satisfaction where the travel is light, as in suburban towns, where a much lighter rail can be used, and paving in some places dispensed with.

We would recommend, for the laying of a good and substantial track, heavy timbers and heavy rails, and for the paving between the tracks, granite, medium stone, or cobble stones; on the tow-path between the tracks we would recommend paving with small cobble stones. We look upon this class of paving as the most durable and economical. In case of repairs to a street, or the tearing up of a street for the laying of sewers, or for any other purpose, the paving is easily put in a proper condition. This class of paving between rails is used in Pittsburgh, Philadelphia, Cleveland, Detroit, Chicago and other places where the cost of transportation is such that it will warrant use of same. It is found by experience that on tow-paths it is better for horses to travel on than any other road-bed that has hitherto been adopted.

We would recommend for suburban towns the construction of narrow gauge roads, and feel confident that they would give greater satisfaction. The width of a narrow gauge road being 3 feet, 3½ feet and 4 feet, prevents other vehicles from traveling on the track, thus preserving the road-bed and preventing it from being cut up. It has been found by experience that on a narrow gauge track a lighter car can be used. A car on a 3 feet gauge track requires 33 per cent. less power to pull it than does a car on the regular standard gauge track of 4 feet 8½ inches. This is a great advantage and economizes horse-flesh.

We would not recommend the T rails, except where they can be used on the sides of the street, where there is comparatively little travel. It is almost impossible to keep a track of this kind properly gauged up, and it is difficult to pave up to it, so that you cannot with its use have a perfect track and road-bed.

A word on car houses and tracks leading into car houses. Car houses should be so arranged as to save all possible room. We should recommend that at the curve from the street to the car house a turn-table should be placed, and two tracks leading therefrom to the house we think advisable. The benefits of a turn-table can be readily seen. In case of fire cars can be handled and got out of the house much easier and with much less help than by pushing them out round a curve to the main track.

Transfer tables in car houses we find almost indispensable. The convenience of this method of transferring cars from one track to another is unsurpassed. The "Improved Transfer Table" we find by experience to be the best. It is easily placed in position and requires no pit to be made, and forms one continuous line of track. By its use all room is utilized without losing space by the laying of cross tracks.

We would urge on street railroad corporations the great necessity of keeping the tracks in good repair and properly gauged up. We notice that very little attention is paid to this matter after the track is once made. This is a great mistake, and of a costly nature.

The joints should be kept well up, thus preventing pounding. If this is not well attended to, the ends of the rails will in a comparatively short time become laminated.

The foregoing we offer as our report on construction. If there are any hints thrown out that may be thought worthy of consideration, we shall think ourselves well repaid.

Respectfully submitted,

CHARLES HATHAWAY.

An interesting discussion followed the reading of this report, in which speeches were made by Mr. Wm. H. Hazzard, Mr. Augustus W. Wright, Mr. Charles Cleminshaw, Mr. L. Brayton, Mr. Kreisiman, Consul-General in Berlin, Prussia, Mr. Moxon, Mr. Maxan, Mr. Wm. Wharton, Jr., Mr. Mulvane, Mr. Henry A. Watson, Mr. Hathaway, Chairman of the Reporting Committee, and other gentlemen. The committee's views were regarded favorably excepting that passage of the report claiming a saving of thirty-three per cent. by the use of the narrow gauge.

The report was adopted, after which the convention adjourned until the evening of the same day.

Business was resumed by the reading of the Report of the Committee on Building, which, taking into account that thirty per cent. of the cost of street railroad operations is in the purchase and care of horses, urged the importance of providing the most sanitary mode of stabling, and named the buildings of the North Chicago City Railway as models of construction.

The adoption of this report was followed by the reading and adoption of one submitted by the committee on Labor and Wages, which recommended the payment of liberal salaries to secure intelligent employés, increased remuneration to employés of long standing and the provision of houses for the men to be paid for on the installment plan.

Mr. Robert Bell, Superintendent of the Detroit City Railway, read a report on snow and ice, which gave a valuable account of the practice in Detroit. In that city plows and scrapers are employed in the removal of snow, preferably to salt, which is found to be too expensive and is used in small quantities.

The subsequent discussion was shared in by Mr. Harding, Mr. James K. Lake, Mr. Threedy, Mr. Wm. H. Hazzard, Mr. Wm. Wharton, Mr. Wm. J. Richardson, Mr. J. E. Rugg and Mr. Charles Hathaway, representing the cities of their respective residence, as given above in the lists of gentlemen present. The prevailing opinion was favorable to the use of salt.

A report on horse shoeing, read by Secretary Richardson, recommended the flat shoe, thus providing for the moistening of the frog of the foot of the horse by its contact with the pavement. Speakers were divided in opinion as to whether or not calks should be used.

The convention aceepted an invitation from Mr. C. B. Holmes, President and Superintendent of the Chicago City Railway Company, to inspect its cable system; one from Mr. Gregier, city engineer, to visit the Chicago water works, and an invitation to a banquet tendered by the Chicago street railway companies. This ended the business of the first day.

On the following morning, (that of the tenth of October,) the convention reassembled at the Grand Pacific Hotel. A lively discussion on heating street cars evidenced a strong dislike to it on the part of the speakers. We subjoin the valuable report on motive power:

REPORT ON MOTIVE POWER.

Your committee on motive power would respectfully submit the following report:

The subject of propelling street cars is by no means a new field of thought, but one to which many minds have lent their most earnest endeavors, in the hope of securing some means of dispensing with the use of animal power, that being the original and most common way of to-day.

In discussing the problem of the different motive powers proposed or adapted to accomplish this end, we have for convenience divided the various systems into three classes, as follows:

1. Locomotive power applied to surface roads.
2. Elevated railroads.
3. Cable railroads.

In the brief time allowed us for the reading of this paper, we will not be able to undertake, as fully as we would like, to give the details of construction and comparative costs of the various classes of motors. And, indeed, to do so would be very difficult, as the local influences are so varied that the question of cost to meet one case would be totally different in the next. We shall have to content ourselves, therefore, with the discussion of the general principles involved in each, leaving the details for further consideration.

Before going into the subject of the different devices suggested for dis-

pensing with animal power, we had better look at some of its defects, or at least the difficulties encountered.

Animal power is divided into two classes, the horse and the mule. We find in discussing the advantages of one over the other with street railroad men, there is a wide difference of opinion on the subject, but by looking at it from an impartial standpoint, we believe that there are certain circumstances under which horses are preferable, and others in which mules can be used to the best advantage, the difference of opinion generally being as to where the line should be drawn. In point of appearance horses are the most desirable, and where the traffic is very heavy, immense loads being hauled, horses having the most weight, are better able to accomplish the work. This is also true when snow storms are encountered, as the draught is very materially increased under such circumstances. On the other hand, it is claimed that horses are much more susceptible to both blemish and disease; that the percentage of disabled horses in a given number will be three or four times that of mules. In New Orleans, for instance, where snow storms are rare, with no grades, where for a large portion of the year an excessive heat prevails, mules beyond any question are the best. As you go north, and encounter grades and severe winters, their advantage decreases, until finally you find all the advantage on the other side, horses being preferred in such cases.

By actual experiment it has been found that the expense of feeding and caring for the horse is very much more than for the mule.

One of the difficulties encountered in the use of mules is the tendency in large mules (of sufficient weight to compare favorably with horses) to being very slow. Mules that are said to be best adapted for use on street railroads are the medium sized ones, in which class, it is claimed, are the largest number of free drivers, which is very necessary to their successful use.

In connection with the subject of animal power, we feel that a word should be said on the subject of car-starters, since the aim in the minds of many inventors who have spent much time and money in both trying to perfect, and, we may say, in perfecting, a mechanical device that will utilize the momentum of the car lost in stopping to be applied in the direction of starting the car.

This thought grows out of the fact that the great majority of people believe, and, indeed, it is a very common expression heard on board street cars, that the wear and tear of the animal is in making the start, and that when a car is in motion it requires little or no exertion on the part of the team to keep up the speed. This to a casual observer would appear to be the case. For instance, when you see the animals straining and tugging to start an immense load of passengers, and when started notice at once the comparative ease with which they draw the same, such a conclusion seems to be the right one.

The fallacy of this is easily proven, however, when the subject is thoroughly investigated.

Regarding the durability of machinery, whether it be a cutting-box or a steam engine, we should examine it when it is worn out or, at least, as it approaches its end of usefulness, to find out and strengthen its weakest parts. Why not apply this rule in examining the worn-out horse (our machine)? We look in doing so for the weak points first, those points which are most susceptible to wear and tear, and we find them where? In the legs, of course. We have heard horsemen say, as we believe truly, that one body will wear out ten pairs of legs in street car service.

Worn-out street-car horses, as a rule, have all their parts intact at the time they are abandoned for service, except their legs. We should go a little further, and confine it to the lower part of the legs, where we find the delicate muscles and sinews that form the ankle and knee-joints. These appear battered and bruised, the adjoining bone unhealthy, the hoof diseased, but otherwise an able-bodied, well animal. If it were in our power to do with it, as we do with worn-out machinery, replace the worn-out parts, there would be no necessity for dispensing with animal power, as, this evil remedied, our rejuvenated machine (the horse) would be a most durable one (if the price of legs were not too high). This much being allowed, examine the horse in the act of starting a load, to find out which of the leg muscles or joints are most actively brought into service. Are they the muscles from the knee down? Are they those delicate joints? Or are they the heavy muscles of the thigh—those muscles that in a worn-out horse are so perfect? We think the latter, for the reason that a disabled street car horse, with the joints misshapen and lower muscles partially disabled, is still an animal capable of pulling an immense load slowly, going to show that its ability to start heavy weights is still perfect, the difficulty being in its power of rapid locomotion. In proof of which, horses that cannot travel fast enough to be of service will pull the heaviest load with perfect ease, indicating that the other pulling muscles are intact and good to the end. You have observed, perhaps, to what good use worn-out car horses can be put on farm work, ploughing, or the heaviest sort of hauling. The greatest draught horses are very often from the worn-out street car horses, where no speed is required, but great strength. A horse will pull a plow or a heavily loaded wagon nine or ten miles a day, in which there is a steady pull every inch of the way; and yet 10 or 15 miles travel on a street railroad is all we can reasonably hope to get as a day's work. If our data are true then, that in a worn-out horse we find those muscles in a perfect state that are brought into action in starting a load, and the defective muscles and joints, those that facilitate him in speedy travel, it would also follow as a logical conclusion that the great strain and tugging in the starting of a load is not nearly so injurious as that hammer, hammer, hammer, on the delicate parts of the lower muscles and joints when a horse is traveling, and apparently doing no work at all.

To state the proposition in a different way, it is the miles traveled and not the load pulled (within certain limits, of course,) that destroys and makes our horses unfit for use. If then, as we say, the argument is a false one that the "great object to be attained to save horse-flesh" is to avoid the strain at starting, we at once have taken away from under the car-starter theory all the ground it had to stand on, and if it were possible to make a machine so simple and durable in all its parts that there could be no complaint on the score of economy, even then, in our judgment, a car-starter is a failure. It is an attempt, we believe, to protect the strongest part of a machine instead of the weakest, and as the measure of strength is always that of the weakest, we have gained nothing.

We will next look a little into the subject of locomotive power as applied to surface roads.

Now we are in a wide field. We have first the ordinary steam locomotive, built with a view of being useful in the public streets—we will say noiseless, smokeless and beautiful to the eye. Then we have the fireless locomotive, receiving its charge of steam at the end of the route from stationary boilers. We have also the pneumatic engine, very closely allied to the fireless engine, the difference being in a charge of compressed air in one case and a charge of steam in the other. Electric engines are also in use, receiving their power from an electric current generated by a stationary steam engine, and transmitted to the car by utilizing the rails of the track to form a part of the circuit.

We have heard suggested, though never tried to our knowledge, the application of a gas engine, that utilized the explosive power of gas as a motor. All of this class of motors rely entirely upon applying motive power so as to rotate the wheels of the car or motor, obtaining their locomotion from the friction between the wheels and the rail. In this they resemble steam railroads, but encounter difficulties that steam railroads know nothing about, our curves being of necessity of a very much shorter radius, and grades in the highway being fixed by the laws of chance, or bad engineering. Even in cases where we are fortunate enough to have a straight and level road, we still have the grit and dirt to contend with that is necessarily present in all thoroughfares. Our track being forced on a level with the surrounding road-bed and not elevated above it as our neighbors'; add to this the snow and ice difficulty, and you have a complete picture. For instance, a number of able-bodied passengers assisting to start a car, with the usual kind words for the management heard on such occasions.

It may be said, in answer to this, that New Orleans has had in successful operation for years steam locomotives applied to their street railroad system. While this is true, the limited way in which it has been used, never having grown at all in its many years of service, proves that even there, under the most favorable circumstances, it has not been very successful. New Orleans uses locomotives on a straight street, without a grade or curve, the track being located in that part of the street not given to the travel of other vehicles, and what is known as "neutral ground," or lawn, situated in the center of the street on which the street railroad track is laid. They only have street grades to encounter at the intersections of cross-streets.

They first adopted on this road what was known as the fireless system of steam engines, getting their heat and pressure from a stationary battery of boilers at one end of the line, obtaining from that sufficient steam to make at least one trip. They have since changed this by adding the fire-box to the locomotive, so as to generate its own steam.

Only under the most favorable circumstances have they been able to keep the road in successful operation with the steam motor. They have never ventured to use it in the busy part of the city.

For ordinary street car service this system presents no advantages, to our mind, over what we have.

The same argument applies with equal force to the use of all motors of this class, viz.: The inability to secure friction sufficient to propel crowded cars under difficulties, unless invention devises some means of increasing the traction of the motor beyond the weight of its load. Cog-wheels would do it, but it is absurd to think of such a thing in practical use.

We claim, in conclusion, in speaking of this class of motors, that they have an insurmountable barrier to overcome, so long as they rely upon merely rotating the wheel to apply the power. In this of course, we are taking for granted the fact that they can produce a machine of sufficient durability and simplicity to be easily controlled by the class of men employed ordinarily on street railroads.

As to elevated railroads, they are, strictly speaking, not one of our class. We are bound, however, to recognize this fact: That there is a point beyond the abilities of our ordinary system of surface roads to do the work required, and when this point is reached, the elevated road becomes a necessity, especially when a great number of passengers over a given line are to be carried a long distance, in which the time occupied in making the trip the ordinary way is too lengthy, condemning, as it does, a vast com-

munity to an imprisonment in a street car of several hours a day, which in the course of a year amounts to many days. For instance, a passenger having seven or eight miles to travel daily from his home to his place of business and return, will on an average consume three hours a day in a car, though he only makes the trip morning and night. This for a year amounts to about 30 days' car riding. The idea of being confined to 30 days' imprisonment in a street car, even to the most ardent admirer of our profession, is not an agreeable thought.

The great expense and cumbersome appearance on the street will, of course, retard their growth until to build them becomes a necessity. In our opinion, there are but few, if any, opportunities for the successful building of elevated railroads in addition to those already constructed.

We now come to the cable system of railroads. This is a system which utilizes the power of a stationary engine, to operate cars at will, miles away from the source of power, transmitting the power by the medium of an endless cable to the point required, and at the necessary time. This system, in our judgment, (though in its infancy now) is on the right road to solve the problem of dispensing with animal power, a system instead of a disadvantage, and less serviceable on heavy grades and in the midst of snow storms, furnishes at such times a superabundance of both speed and ability to resist obstacles—a system that does not depend upon the friction between the wheels and the rail for its power of locomotion; a system that enables street railroads to handle immense crowds by the simple addition of a few more bushels of coal and the putting on of extra cars, without the fear of overloading its animals, and killing more in one day than its profits would be in a month; giving us, in other words, more latitude in the way of economizing in dull times (without having horses to feed, whether they work or not), and furnishing ample means of expansion on short notice, without the necessity of hiring extra animals for such occasions.

Do not mistake our eulogy of this system by believing that we are blind to its faults, as it is of its faults that we desire most fully to be heard, hoping that in the discussion of the difficulties in its way, we may encourage the already stupendous efforts in the direction of curing them. We realize that there are many with ample means laboring for the attainment of this very end. Their success, to our mind, is but a question of time.

The cable road, as it is to-day, is only available under the most favorable circumstances. First, it requires a magnificent business, for the reason that the outlay is so great that an enormous sum is eaten up in paying interest on the cost of construction. It requires a comparatively straight road, for the reason that as yet the turning of curves in an economical and simple manner has not been accomplished to our knowledge. There are a number of minor defects, which are always found in new machinery. These can only be remedied by time and experience. But minor troubles should not discourage us in the least, our main objection being to the two points above stated. The first, the heavy outlay involved, is not so serious a matter, as we see indications of a simpler and more economical construction being developed. Add to this the very low price steel has reached, with the tendency still downward, we are of the opinion that the cost of the road-bed construction will, in a short time, be greatly reduced. As to the difficulty they have in accomplishing curves, we are quite sure that invention will devise some means of curing the evil. The system as it is now has, as its worst objection, the great expense in the maintenance of auxiliary cables. But with all its defects it gives us great hope.

We believe, in conclusion, that the only practical means presented to our view for dispensing with animal power is the cable system. At present the cable road is confined to a few favorable localities, but rapid strides are being made in the direction of its perfection, which will surely result in bringing its motive power within the reach of roads less favorably located.

Concluding, we will add, beware of car-starters, and lend a helping hand to those trying to perfect that system which is at present our only hope for dispensing with the annoyance and expense of animal power.

Mr. C. B. Holmes, superintendent of the Chicago City Railway Company, responding to an invitation to address the convention, stated that the company now operates twenty and a half miles of cable. While it costs twenty cents a mile to run cars with horses the cable system run them for ten. Blocks made of Babbitt metal had been found preferable to wooden blocks in the clutch to grip the cable. The company's cable had cost twenty-five cents a foot, and the entire cost per mile of road had been $105,000. The total expenditure for the cable roads had been two and a quarter million dollars.

A discussion, following the report of the committee reporting on the collection of fares, seemed to show that the feeling of the convention was in favor of using means to prevent fraud and carelessness on the part of conductors, while report favored the bell-punch as generally, if not in all cases, preferable to the stationary register; the opinion of several speakers was strongly in favor of the latter, bell-punches being easily counterfeitable.

An amendment, proposed by the Executive Committee, changing the date of the annual meeting from the second Tuesday in October to the third Wednesday of the same month, was carried.

At the adjourned and final meeting of the convention, held on the evening of the tenth of October, the following official appointments were made: President, William H. Hazzard, president City Railway Company, Brooklyn, N. Y.; first vice president, James K. Lake, superintendent Chicago West Division Railway Company, Chicago, Ill.; second vice president, George B. Kerper, president of the Mt. Adams & Eden Park Inclined Railway, Cincinnati, O.; third vice president, D. F. Longstreet, secretary and treasurer Union Railway Company, Providence, R. I.; secretary and treasurer, William J. Richardson, secretary Atlantic Avenue Railroad Company, Brooklyn, N. Y.; executive committee, H. H. Littell, Louisville, Ky.; John G. Holmes, Pittsburgh, Pa.; J. E. Rugg, Boston, Mass.; P. G. Maffett, St. Louis, Mo.; Jacob Sharp, New York, N. Y.

The next annual convention of the American Street Railway Association will be held in New York City.

List of Recent Patents for Inventions Relating to Tramways.

BEARING DATE SEPTEMBER 4, 1883.

284,160. PAD-TREE FOR HARNESS: Henry Gustav Albrecht and Christian Neilson, Wahpeton, Dak. Filed Dec. 19, 1882.

284,254. GUARD ATTACHMENT FOR CITY-RAILWAY CARS: John Stephenson, New York, N. Y. Filed April 25, 1883.

284,419. HARNESS-SADDLE: Michael C. Hayes, Boston, Mass. Filed June 28, 1883.

284,445. HEAD-NET FOR HORSES: Luther B. Lee and George W. Lee, Ridgewood, N. Y. Filed July 21, 1883.

284,563. CONTROLLING-STRAP FOR HARNESS: Geo. Kinnier, Jr., Baltimore, Md., assignor to Adelia Kinnier, same place. Filed June 18, 1883.

BEARING DATE SEPTEMBER 11, 1883.

284,658. HORSE-COLLAR PAD: William H. Osmer and Robert M. Grier, Bonfils Station, Mo. Filed June 25, 1883.

BEARING DATE SEPTEMBER 18, 1883.

285,012. HALTER: Juliaette W. B. Carpenter, Medford, Mass. Filed Aug. 6, 1883.

285,026. FLY-NET: Timothy Gingras, Buffalo, N. Y. Filed Aug. 6, 1883.

285,177. HARNESS-SADDLE: Jos. B. Sulgrove, Indianapolis, Ind., assignor to Mary L. Sulgrove, same place. Filed April 21, 1883.

285,215. HORSESHOE: George W. Bowen, Fort Wayne, Ind. Filed Jan. 9, 1883.

285,252. FEED-BAG: James W. Gedney, New York, N. Y. Filed Aug. 3, 1883.

285,261. HORSESHOE: Francis M. Hartman, Marathon, Ohio. Filed April 28, 1883.

285,268. ANIMAL-POKE: Stephen N. Howard, Eatonton, Ga. Filed Jan. 18, 1883.

285,353. PROPELLING CARS BY ELECTRICITY: Jos. R. Finney, Pittsburgh, assignor to himself and Thomas B. Kerr, Allegheny, Pa. Filed Feb. 15, 1882.

BEARING DATE SEPTEMBER 25, 1883.

285,379. HARNESS: John Beha, Louisville, Ky. Filed May 26, 1883.

285,428. HAME-FASTENER: Andrew Niccum, Topeka; Kans.; James R. Niccum, Administrator of said Niccum, deceased. Filed Jan. 15, 1880.

285,434. HARNESS-BUCKLE: Samuel S. Sargeant, Newark, N. J. Filed Aug. 16, 1883.

285,466. REIN-HOLDER: Abraham Cottrell, Lansing, Mich. Filed July 14, 1883.

285,468. REIN-HOLDER: J. Edward Daniels, Holbrook, Mass. Filed Jan. 4, 1883.

285,514. CABLE RAILWAY: Henry Root, San Francisco, Cal. Filed July 30, 1883

285,525. REIN-HOLDER: Judson L. Thomson, Syracuse, N. Y. Filed Oct. 26, 1883.

285,562. SOFT-GROUND HORSESHOE: Lyscom Brigham, Orangeville, Mills, Mich. Filed July 28, 1883.

285,717. BRIDLE-BIT: Oscar Wiener, Henry Coates and Simon Wiener, Newark, N. J. Filed Dec. 1, 1882.

285,742. FARE-BOX: T. Walter Fowler, Washington, D. C., assignor of one-half to Daniel W. Glassie, same place. Filed May 28, 1883.

285,746. STREET-PAVEMENT: Virgil A. Gates and Mordecai Levi, Charleston, W. Va. Filed July 21, 1883.

To the Editor American Railroad Journal.

SIR:—I have read with interest your article in the August number entitled, "The Street Railroad Problem," and having given somewhat of time and thought to the same subject, venture a few remarks.

I agree with you that some motor cheaper and better than horse-power, is most desirable; but the problem is beset by diffiulties and remains unsolved. The strongest advantage of the cable system is that it is independent of the adhesion of the driving-wheels upon the rail. Almost every other system, other than animal power, is dependent upon this fact. What is the result? Simply this: if the motor be made independent of the passenger car, a construction possessing many advantages, it must depend upon its own weight for adhesion. "By adhesion is meant the resistance which prevents or opposes the slipping of the driving-wheels on the rails, and is due to the friction of the former upon the latter; which, like all friction, depends upon the weight or pressure of the two surfaces in contact, and consequently upon the load which rests on each wheel, It also depends upon the condition of the rails, and probably to some extent upon the material of which they and the tires on the wheel are made. If the rails are quite dry and clean it will require a force equal to about one-fourth the weight on the wheels." (Catechism of the Locomotive).

Upon the rails in the streets in most of the cities of this country this adhesion would be greatly lessened. In the absence of direct experiment, I am not prepared to say positively how much, but should venture the opinion it would be reduced at least one-half by the greasy, slimy, unctuous mud, that in this city at least, covers the flat rail head nine-tenths of the time, when it is not washed by rain or snow. In proportioning a train to the locomotive's capacity, due regard is had to the condition of the rail, and if the latter become wet and slippery from dew, rain, etc., fewer cars are taken. Upon most street railroads, not more than one car would be permitted to be attached to the motor for obvious reasons regarding the safety of passengers and those upon the street, the danger of accident being increased. A motor must therefore be proportioned to make its maximum load at *all times*, and under the most favorable conditions of traction. It must be heavy enough to have a reserve of power, and adhesion to surmount the steepest grades and sharpest curves upon the road with its *greatest* load. It must be heavier in proportion than a locomotive for two reasons: First, because its adhesion is less, on the flat, muddy street rail. Second, because the resistance to progress on these rails is much greater. The usual allowance for this friction upon a straight and loose track of "T" rail is six pounds per ton to keep the car in motion after starting, an average of fifty-three measurements upon a new street rail track of this company gave twenty-nine and four-fifth pounds per ton—nearly five times as great! Recognizing these facts, Mr. Pole in his motor, "deriving fire from a gas, or other engine, operating upon a series of pumps or valves, sets in motion the movements of the motor. In the first place there are two fluid cylinders so arranged as to bring the pressure of the fluid upon a foot which goes down upon the cobble stones between the tracks, making a step of 3 ft. 2 inches in length; and every time this grip-like device, fitted with teeth and easily adjusted for receiving purchase or hold, makes a step, the motor is propelled or pushed forward 3 feet 2 inches, the step to be increased or decreased by regulation from the engineer. The foot is padded with rubber, which gives its stroke upon the earth such elasticity that there is no jar or sudden start." David Gordon, December 18th, 1824, proposed a similar machine in his English patent of that date, except that he used steam as a motor. It has not been heard of for these many years!

"There is nothing new under the sun." So far as I know, the chief cause of failure in most motors, has been this necessity of making them so very heavy (for the above described reasons) resulting in great wear and tear of track and its rapid depreciation, entailing greater expenditure in maintenance than the saving over horse-power. Compressed air as tried by this company years since was unsatisfactory, and the experiment abandoned. The above brief statement, Mr. Editor, is my reason for asserting the inferior advantages of horse-power up to this time, and I have seen the statement that the Paris tramways, after numerous experiments with divers motors, have returned to horse power. The practical working and financial survey of the cable system in this city does not appear to be such as to cause its immediate adoption elsewhere, and "puzzles the will and makes us rather bear those ills we have than fly to others, that we know not of."

Respectfully,

AUG. W. WRIGHT, Supt. Track & Cars,
September 21, 1883. with Chicago Central Ry.

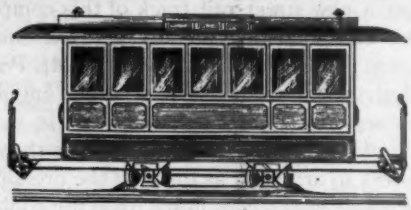
THE horse population of the United States is now over 11,000,000, or about one horse to every five humans. According to the 1880 census, the leading horse states, with number of horses respectively, were: Illinois, 1,023,082; Ohio, 736,478; New York, 710,358; Pennsylvania, 534,587; Michigan, 378,778; Kentucky, 372,648. Two-thirds are draught and all-work horses, and one-third are used for pleasure driving.

A MILLIONAIRE in Philadelphia who endorses the views of Mr. Charles Francis Adams, Jr., about the dead languages, says that he lives in the most convenient place in the city, for "the horse-cars run *pro* and *con* on his street."

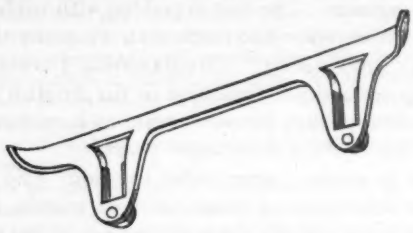
THE only international street railroad in the world is the one which connects El Paso, Texas, with Paso del Norte, Mexico, two and one-half miles long.

Street Car Fenders to Prevent Accidents.

THE fenders shown in the illustrations are intended to prevent street cars running over children, and to throw off



every stone from the track larger than one and a half inches in diameter, besides keeping the track clear enough of snow for the car to run readily. They are attached to the journal boxes instead of to the body of the car, run one and a half inches from the rail, are unaffected by the jolting

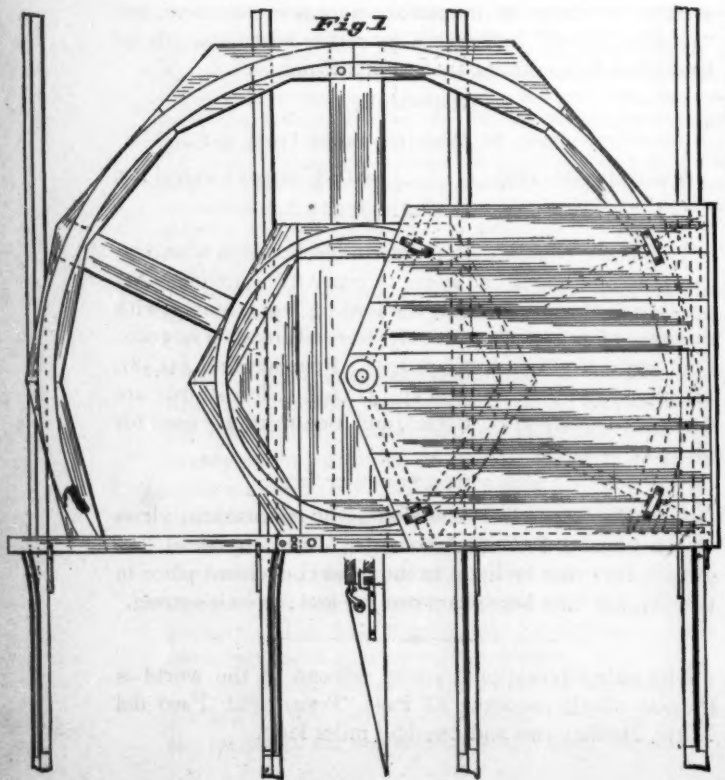


or action of the springs, pass along the sides of the wheels and curl around in front of them, and are provided with a lever by means of which they may be lifted out of the way if an obstruction is to be passed, or the track left for any reason. They are cheap and easily adjusted.

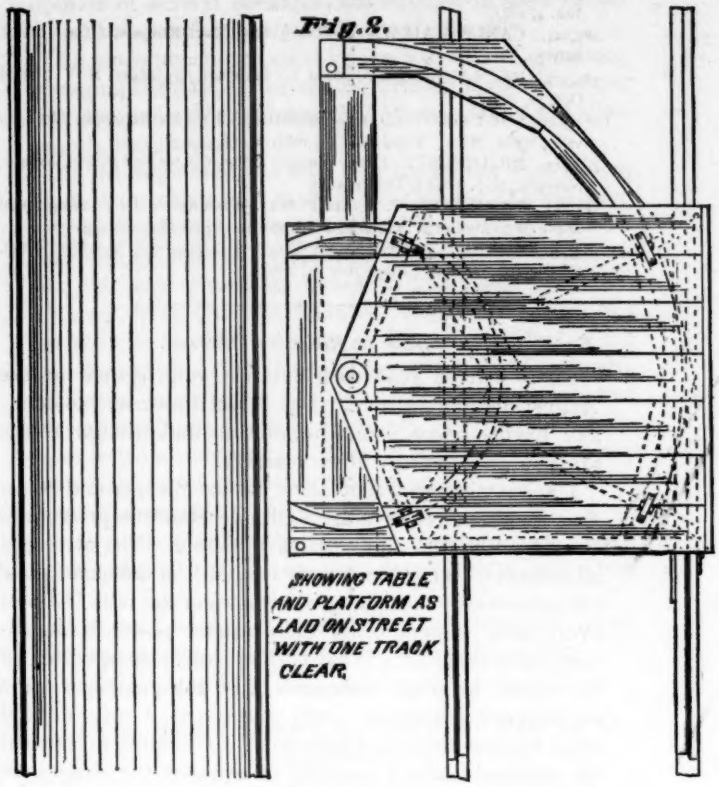
For further information apply to Theodore Hunt, No. 413 North 12th street, St. Louis, Mo.

Portable Turn-Table and Switch.

FOR STREET RAILWAY COMPANIES.



THE accompanying cuts represent a "Portable Turn-Table and Switch combined," especially adapted for use along the route in case of blockade to street cars, or for



temporary use at ends of line, while permanent tables are undergoing repairs. It is built in four sections, and is easily handled, and simple to lay and operate.

Its advantage as a portable table and switch is, that it can be thrown into a wagon and carried to any part of the road, and there laid in three minutes' time by any person of ordinary intelligence.

It costs less, delivered in any city in the Union, than the price at which an ordinary switch can be laid, and its advantage over the switch is that it can be laid at any point on the road, and the car can be turned around and transferred to opposite track in one-half minute's time.

Two of these tables have been used in St. Louis during the procession of the Veiled Prophets on Oct. 2d, 1883, one by the Union Railway Company, and one by the Lindell Street Railway Company. Both large and small cars were turned on them, and many of the cars had on board from twenty to thirty passengers, who remained in the cars and were turned with safety. Each of these tables cleared its entire cost in two hours' use, besides affording accommodation to a large number of the patrons of the roads.

It is the invention of Geo. W. Baumhoff, secretary of the Lindell Street Railway Co., of St. Louis.

A Car-Starter.

A CAR-STARTER, the invention of Henry Clark, of Milwaukee, Wisconsin, deserves more than the local celebrity it has attained.

The principle on which it works is by what is technically termed the "knee movement" and "foot." The inven-

tion is placed directly under the fore portion of the car, being attached to the bottom of the car, and to a lock directly underneath the driver. When the driver desires to stop the car on an upward grade, he steps on a slight projection in his box, which opens a lock underneath and enables the cross-tree, to which the machine is attached by a sliding bar, to fall to the ground. The knee-motion has the effect of causing an iron foot to fall directly underneath the central portion of the car, which coming in contact with a projection in the road-bed, anchors the car firmly and prevents it from sliding back in the least. In case the brake should become unmanageable or out of order on a down grade, the car could be instantly stopped by opening the lock, which is done simply by a pressure of the foot, and a bar which is a continuation of the iron sliding bar in front, operates in the same manner as the foot under the center. When the car-driver desires to start up, the foot being on the ground, he merely gives the line to the team. The unopened lock allows the cross-tree to rest almost on the ground. As the horses move on, the motion has the effect of raising the cross-tree until it rises to the height of the lock, when it at once becomes fastened. In doing so, the knee-motion also raises the foot under the center of the car, and the impetus thus given by the resistance of the foot on the ground starts the car gradually and gently.

Helms Bros. & Company, corner of Washington and Barclay streets, Milwaukee, will be pleased to forward information to inquirers.

DR. A. C. HAWES, of Noroton, Conn., has secured Letters Patent, in the United States and Canada, for an improvement in "Horseshoes," especially adapted for winter use, or whenever the frequent sharpening of calks is required.

The improvement is in the "Duplex shoe," or thin plate and shoe combined. The plate and shoe, cast in steel or malleable iron, are paneled and ribbed, forming a *light strong shoe*, with hardened calks.

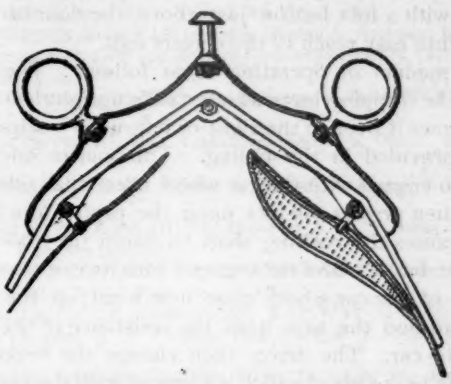
The plate, provided with suitable projections for keeping the shoe in place, is nailed to the hoof, in the usual manner. The shoe, (corresponding in number), is then secured to the plate with counter-sunk screws, or small square-headed bolts, as preferred, which hold the shoe as firmly in place as when nailed to the hoof. The shoe can be quickly removed, and a new or duplicate (sharp) shoe replaced, without delay, disturbance or *injury* to the *hoof*, and at less expense than the present method of sharpening calks. "Toe weights" can be adjusted in the same manner.

According to the universal testimony of writers upon the horse, frequent removal of the shoe causes a waste of material far exceeding the natural growth of the foot.

"As the value of the horse depends more upon the soundness and strength of the hoof, than any other qualification," and as this shoe obtains and preserves this condition, and saves valuable time, its importance can hardly be overestimated.

Gurney's Harness Saddle.

THE harness saddle invented by J. Theodore Gurney, of Boston, and patented by him, combines, as stated in the claim and readily made out in the illustration, the pad-plate, the tree having the downwardly-extended walls or



flanges, and having a tight wall or cover between said downwardly-extending walls or flanges, and the anti-friction rollers mounted in said tree and concealed beneath the wall; the combination, with the pad plates of the tree having anti-friction rollers mounted therein, the downwardly-extended flanges or supports for said rollers, and a cover or wall between the downwardly-extending flanges or roller supports, said parts being arranged to conceal the rollers and that portion of the back strap lying upon or in the tree; in a harness saddle, the combination of the tree, the pad plates pivoted or hinged thereto and arranged to rock relatively thereto when in use, and the anti-friction rollers mounted on the axes of the pad plate; in a harness saddle, the combination of the pad plates, the tree having anti-friction rollers for the back strap, a pivot extending from one side of the tree to the other for connecting the said pad plate to the tree, and which is situated out of the line of the back strap to avoid contact of the latter therewith; the combination of the tree having downwardly projecting supports or flanges, anti-friction rollers mounted in the tree for the back strap, the pad plates, the pivotal support on the tree for the pad plate, and the connecting devices carried by the pad plate and loosely attached to the pivot, and situated between the vertical flanges of the downwardly-extended supports or flanges.

The Dickinson Car Brake and Starter.

THIS brake and starter, Patent No. 283,219, is so constructed as to store up the force exerted by the momentum of the car while stopping, upon a spring coiled around the axle, which force is expended to start the car.

The construction is as follows: Each end of the spring fastened to a brake wheel, the whole moving freely upon the axle, to right or left. Each brake wheel has cast upon its outer face, ratchet teeth to engage with similar teeth

upon the inner face of the car wheel. Two brake shoes are so placed as to clamp the rim of the brake wheel firmly. The whole is built within a light frame which is connected, by means of a rocking shaft running the entire length of the car, with the shipping levers which stand upright at each end of the car. There are two other rocking shafts, also running the entire length of the car, one on either side of the shipping shaft, which are connected with a knuckle jointed lever, the office of which is to clamp and unclamp the brake shoes upon the brake wheels. These two rocking shafts have a two-armed lever upon each end, each end of the lever being suitably connected with a foot button just above the floor of the car and within easy reach of the drivers foot.

The manner of operating is as follows: The driver grasps the shipping lever which stands upright before him, and throws it over to the right or left, until it slips into a notch provided in the railing. This causes one brake wheel to engage with the car wheel upon that side. The driver then presses his foot upon the proper foot button, which causes the rocking shaft to clamp the brake shoes upon the brake wheel not engaged with its car wheel. The motion of the car wheel must now wind up the spring coiled around the axle, until the resistance of the spring stops the car. The driver then clamps the brake shoes upon the brake wheel which is engaged with the car wheel. To start the car the driver again grasps the shipping lever, and throws it in the opposite direction until it slips into the notch provided. This disengages the brake wheel first engaged and causes the opposite brake wheel to engage with its car wheel. The driver now, by pressing the proper foot button, unclamps the brake shoes from the brake wheel just engaged, and the spring in uncoiling exerts the same force to start the car which it received from the momentum of the car while stopping it. It can be used as a friction brake in descending a hill, for instance, when the starter is not needed, by clamping the brake shoes upon the engaged wheel and leaving the other open. It can be applied to one or both axles as may be required. The starter can be wound up for use when the end of the line is reached, and after hitching his horses to the other end of the car, for the return trip, the driver can use the starter from this end as readily as from the other.

The inventor of the Car Brake and Starter is Arthur S. Dickinson, No. 144 State street, Springfield, Massachusetts.

Help for the Horses.

PATENT No. 284,948, called Car Starter, J. G. Crate, of Woodstown, New Jersey, and J. F. Morell, of Camden, New Jersey, patentees, is a device intended for use, especially on street cars run by horses, to save the strain on those animals in so frequently starting the car, by which so many of them are broken down. It is constructed to gather and hold the power required in arresting the momentum of the car in stopping it, and to apply that power when needed to start the car. It is simple in its parts and easy of application.

There are two beveled cog wheels at suitable distance from each other, made fast on the axle of the car, so as to turn with it. A revolving rod runs the whole length of the car just above the axles, with a beveled cog wheel made fast on it at a point to act on either of the cog wheels aforesaid on the axle, at the will of the operator. Said rod is pivoted in the center in a yoke, so as to admit of the lateral motion needed in being acted between said wheels. A powerful spring (or several springs if necessary) is made fast at one end to the rod, and at the other end to the top of the yoke in which the rod is pivoted. In this spring the power is gathered in stopping the car, by the revolutions of the rod, when the wheel made fast to it is thrown in contact with the proper wheel on the axle to do it. And from this spring the power thus gathered is projected in starting the car when needed for that purpose, by throwing said wheel in contact with the other wheel on the axle of the car. Each end of said rod connects with and revolves in the lower end of a lever, which descends beneath the floor of the car, and is operated from above by the driver at will, in throwing the wheel on the rod in contact with either of the wheels on the axle. To hold the power in the spring when it is wound up, and give perfect control of it till needed for use, a ratchet wheel is made fast to each end of the rod, which locks with a dog, which dog is acted upon by a spring to hold it to its proper work upon the ratchet wheel while the motion of the car is being arrested. When the power is needed to start the car the dog is thrown out of position by the pressure of a small lever which, like the dog itself, is pivoted on the main lever to hold the rod wheel firmly in contact with either wheel as needed in stopping and starting the car, or centrally between them when not thus in action; there is a device connected also with the main lever and operated by a pressure of the foot, by which it is made secure in either of the three positions desired. The object in having ratchet wheels and the apparatus described at both ends of the rod instead of at only one end, as also in pivoting the rod at the center, is to provide for running the car in either direction. When running in one direction the dog at the opposite end is thrown out of contact with the ratchet wheel, and the rod is left to be operated from the forward end, the order of which is reversed when the car is run in the opposite direction. It is manifest, therefore, that on cars designed to run only in one direction the rod can be terminated at the center of the car, and have the apparatus for operating it at only one end.

While the prime design of this invention is to save the waste of horses so obvious in starting street cars, the patentees claim that by means of the perfect control their invention gives of the power, in carrying it any distance desired and using it at will, it can be made very useful on common road vehicles in a hilly country, in helping the horses with a load up hill with the power gathered in the spring in a previous descent. They also claim that it is capable of being applied to steam car roads with benefit, in saving the extra feed used on roads where frequent stops are made. It is almost noiseless in its operations and free from sudden jerks.

THE CHECK-REIN.—"The horse has to work very hard for his living, and he has a right to be so harnessed as to do his work in the way most easy to himself. It is heartless to set a poor beast to work his hardest, and tie him up into a cramped position that he may look handsome while doing it."—*Dio Lewis.*

New Inventions.

TO INVENTORS.

THIS department of the JOURNAL is devoted to descriptions of new inventions applicable to railroads. We publish each month a list of the same, and invite each inventor to forward us a description of his invention, believing the publication of facts regarding them will be perused with interest by railroad men, and all interested in the development of our railroad system. *We make no charge for publishing these.*

List of Patents for Inventions Relating to Railways, Machinery, Etc.

BEARING DATE SEPTEMBER 4, 1883.

284,164. STEAM-ENGINE GOVERNOR: Frank H. Ball, Erie, Pa. Filed Dec. 27, 1882.

284,169. RAILWAY-RAIL JOINT AND LOCK: Thomas E. Billington, Des Moines, Iowa. Filed Dec. 22, 1882.

284,194. CAR-AXLE: Charles E. Eaton, Chelsea, Mass. Filed March 19, 1883.

284,195. FEED-WATER ALARM-INDICATOR: Dewitt Ellsworth, Riverdale, Mich. Filed May 1, 1883.

284,201. CAR-BRAKE: Louis Henri Hebert, St. Johns, Quebec, assignor of two-thirds to Joseph Jerome Hebert and Arthur Joseph Hebert, St. Henri, Canada. Filed May 24, 1883.

284,204. STEAM-GENERATOR: Samuel L. Hill, Brooklyn, N. Y. Filed Feb. 13, 1883.

284,205. CAR-COUPLING: Alfred B. House, Junction City, Kans., assignor of two-thirds to Jacob B. Callen and Horace E. McFarland, same place. Filed March 14, 1883.

284,209. CAR-AXLE LUBRICATOR: William J. Jackson, Osceola Mills, Pa., assignor to the Osceola Manufacturing Company, (Limited,) same place. Filed June 9. 1883.

284,250. RAILWAY-CAR STEAM-HEATER: Nicholas Slingland, Falls Village, Conn. Filed April 20, 1883.

284,260. CAR-COUPLING: Charles W. Townsend, Charleston, S. C. Filed May 9, 1883.

284,303. LUBRICATOR: Anthony Ittner, St. Louis, Mo. Filed June 26, 1883.

284,328. GAS-ENGINE: George H. Reynolds, New York, N. Y., assignor of one-half to Cornelius H. Delamater, George H. Robinson, and William Delamater, same place. Filed July 27, 1883.

284,330. CAR-WHEEL: Luther A. Roby and Samuel T. Wellman, Cleveland, Ohio. Filed Feb. 16, 1883.

284,340. LUBRICATOR· Allen W. Swift, Elmira, N. Y. Filed Jan. 27, 1883.

284,361. HEAT INSULATION OF REFRIGERATOR CARS AND BUILDINGS: Samuel K. Bayley, Boston, Mass. Filed Jan. 18, 1883.

284,365. ELECTRO-MAGNETIC CAR-WHEEL AND BRAKE: Henry M. Beidler, Texarkana, Ark. Filed Jan. 17, 1883.

284,366. NUT-LOCK: Thomas Bell, Akron, Ohio. Filed July 14, 1883.

284,395. BALANCED SLIDE-VALVE: John J. De Lancey, Binghamton, N. Y. Filed June 5, 1883.

284,415. STEAM-BOILER: David Groesbeck, New York, N. Y., assignor to the Groesbeck & Wright Spark Arrester Company, same place. Filed Sept. 23, 1882.

284,436. CAR-COUPLING: Henry M. Keith, Erving, Mass. Filed June 7, 1883.

284,438. COW-CATCHER FOR LOCOMOTIVE-ENGINES: Ezra B. Lake, Ocean City, N. J. Filed Feb. 2, 1883.

284,448. CAR-WHEEL: William I. Lindsay, Cleveland, Ohio. Filed Jan. 22, 1883.

284,453. EJECTOR: Daniel W. Magee, New York, N. Y., assignor to Ebenezer P. Miner, Hartford, Conn. Filed June 11, 1883.

284,468. SECTIONAL SAFETY-BOILER: Edward J. Moore, Baltimore, Md. Filed Jan. 15, 1883.

284,472. CUT-OFF VALVE: Benjamin F. Olmsted, Grand Rapids, Mich. Filed June 15, 1883.

284,476. CHANGE-SPEED MECHANISM: Thos. J. Perrett, Jamestown, N. Y. Filed Aug. 2, 1883.

284,504. CYLINDER-COCK: Daniel Smullen, St. Louis, Mo., assignor to the Excelsior Manufacturing Company, same place. Filed April 14, 1883.

284,520. LOCOMOTIVE ATTACHMENT: Orlando Wetmore, Nevada, Mo. Filed Jan. 12, 1883.

284,556. GAS-ENGINE: George M. Hopkins, Brooklyn, assignor to the Economic Motor Company, New York, N. Y. Filed March 31, 1883.

284,568. JOURNAL-BOX COOLER: Robert C. Morris, Olney, Ill. Filed Jan. 22, 1883.

BEARING DATE SEPTEMBER 11, 1883.

284,587. VALVE: Alexander G. Alexander, Detroit, Mich., assignor to John Gilliard, New York, N. Y. Filed March 24, 1883.

284,610. FIRE-BOX FOR STEAM-BOILERS: Edwin E. Carter, Waynesburg, Pa., assignor to Sarah E. Carter, same place. Filed June 29, 1883.

284,614. INJECTOR: Henry F. Colvin, Philadelphia, Pa. Filed Nov. 17, 1882.

284,618. TOOL FOR EXPANDING THE ENDS OF BOILER-TUBES: John F. Dettmar, Brooklyn, assignor to Richard Dudgeon, New York, N. Y. Filed May 17, 1883.

284,624. CAR-COUPLING: Jackson B. Garrett, Eagle Springs, assignor of one-half to M. Surratt, Waco, Tex. Filed May 5, 1883.

284,632. SEAL-LOCK FOR CAR-DOORS: George J. Hartman, Lake, assignor to William H. Lotz and Edward Carqueville, both of Chicago, Ill. Filed May 4, 1883.

284,635. VALVE: Charles B. Hitchcock, Indianapolis, Ind. Filed May 8, 1883.

284,644. CAR-COUPLING: Geo. Lighthiser, Napoleon, Ohio. Filed Feb. 17, 1883.

284,646. SPARK-ARRESTER: William A. Maloney, Denver, Col. Filed July 23, 1883.

284,668. INSULATED RAIL-JOINT: Theodore A. B. Putnam, New York, N. Y. Filed March 20, 1883.

284,669. RAILWAY-CROSSING GATE OR SIGNAL: Theodore A. B. Putnam, New York, N. Y. Filed Sept. 27, 1882.

284,670. ELECTRICALLY OPERATING RAILWAY GATES OR SIGNALS: Theodore A. B. Putnam, New York, N. Y. Filed April 16, 1883.

284,681. ROTARY STEAM-ENGINE: David L. Smith, Big Rapids, Mich., assignor to himself and Nathan H. Vincent, same place. Filed Jan. 5, 1883.

284,682. APPARATUS FOR HEATING CARS AND EXTINGUISHING FIRES ON RAILWAY-TRAINS: Erastus W. Smith, New York, N. Y. Filed April 10, 1882.

284,690. AUTOMATIC CAR-BRAKE: Charles Van Dusen, New Albany, Ind., assignor of one-half to William L. Breyfogle, Louisville, Ky. Filed June 30, 1883.

284,691. DUMPING-CAR: Matthew Van Wormer, Melrose, Mass. Filed April 24, 1883.

284,701. PORTABLE STEAM-ENGINE: William C. Wolfe, Hagerstown, Md. Filed June 20, 1883.

284,713. CAR-SPRING: Sumner A. Bemis, Springfield, Mass. Filed June 14, 1883.

284,716. RAILROAD-SIGNAL: George W. Blodgett, Boston, and Geo. R. Hardy, Newton, Mass. Filed Jan. 15, 1883.

284,719. OSCILLATING STEAM-VALVE: John M. Buckley, Sedalia, Mo. Filed July 2, 1883.

284,733. SLEEPING-CAR: Henri Gillaume, Washington, D. C. Filed July 2, 1883.

284,744. STEAM-ACTUATED VALVE FOR PUMPS: Louis Lamy, West Hoboken, N. J. Filed Feb. 9, 1883.

284,758. CAR-REPLACER: Albert Reed, Binghamton, N. Y. Filed March 7, 1883.

284,762. FEED-WATER REGULATOR FOR STEAM-BOILERS: George P. Salisbury and Charles W. Foster, New Haven, Conn. Filed May 22, 1883.

284,766. AUTOMATIC CAR-BRAKE: George T. Smallwood, Jr., Washington, D. C., assignor of one-half to James Henry McLean, St. Louis, Mo. Filed Oct. 5, 1882.

284,768. DEVICE FOR OILING SLIDES FOR ENGINES: Clement C. Smith, Lancaster, Pa. Filed July 20, 1883.

284,770. COMBINED CHECK AND STOP VALVE: Lexor B. Snow, Cleveland, Ohio. Filed Jan. 26, 1883.

284,789. CAR-COUPLING: Ferdinand Woodward, Sacramento, Cal. Filed June 13, 1882.

284,797. CAR-COUPLING: Addison D. Atwood and Charlie M. Atwood, East Portland, Oregon. Filed May 11, 1883.

284,800. CAR-AXLE: George W. Bedbury, Portland, Oregon, assignor of one-half to L. M. Cox and James E. McLaughlin, same place. Filed May 12, 1883.

284,819. STOCK-CAR· Alfred W. Clifford, Johnstown, Pa. Filed April 30, 1883.

284,886. CAR-COUPLING: John G. Peace and Eben B. Sankey, Salem, Mo. Filed Feb. 12, 1883.

284,896. CAR-COUPLING: Matthias Ralph, Sr., Ursa, Ill. Filed June 8, 1883.

284,898. CAR-COUPLING: Andrew J. Redman, La Crosse, Kans., assignor to himself and Clifford R. Scranton, same place. Filed Feb. 8, 1883.

284,900. DEVICE FOR CLEARING RAILROAD-CUTS OF SNOW: William C. Rice, Oakland, Iowa. Filed April 25, 1883.
284,902. CAR-COUPLING: Francis H. Richards, Springfield, Mass. Filed Feb. 28, 1883.
284,937. CAR-COUPLING: Jay Lamotte Williams, Lone Tree, Iowa. Filed June 11, 1883.
284,948. CAR-STARTER: Joseph G. Crate, Woodstown, and James F. Morell, Camden, N. J. Filed May 16, 1883.
284,964. PISTON-VALVE: Chas. H. Hyssong, Altoona, Pa. Filed June 18, 1883.
284,974. CAR-COUPLING: George W. Norton, Freeman, Me. Filed Jan. 2, 1883.

BEARING DATE SEPTEMBER 18, 1883.

284,997. VISE: James O. Barrett, Erie, Pa. Filed May 28, 1883.
285,042. CAR-COUPLING: Charles J. Langenbach, Dorchester, Iowa. Filed May 28, 1883.
285,047. PNEUMATIC GRAIN-ELEVATOR: Jos. Lewis, Chicago, Ill. Filed June 29, 1883.
285,068. LOCOMOTIVE-BRAKE: George Hamilton Poor, Portland, Me., assignor to the American Brake Co., St. Louis, Mo. Filed May 10, 1883.
285,082. CAR-WHEEL LUBRICATOR: Joseph Stephenson, Osceola Mills, Pa. Filed July 6, 1883.
285,084. VALVE-GEAR FOR STEAM-ENGINES: Frank M. Stevens, New York, N. Y., assignor to the Stevens Locomotive and Machine Company, same place. Filed Feb. 13, 1883.
285,100. TRAVELING CRANE: Henry M. Barnhart and Edward Huber, Marion, Ohio. Filed Aug. 6, 1883.
285,116. PORTABLE ELEVATED RAILROAD: Benjamin S. Curtis and John A. Cook, Cape May, N. J. Filed April 17, 1883.
285,122. NUT-LOCK: Samuel Gissinger, Pittsburgh, Pa., assignor of one-half to John R. Large, same place. Filed Oct. 20, 1882. Patented in England April 26, 1882, No. 1,970.
285,123. CAR-WHEEL BORING AND TRUING MACHINE: James H. Gowan, Chicago, Ill., assignor of a part to Augustus O. Hall, George H. Peeke, and William P. Black, all of same place. Filed Feb. 27, 1882.
285,142. RAILWAY-CHAIR: Charlie E. Mark, Flint, Mich. Filed Mar. 10, 1883.
285,145. CAR-COUPLING: James C. Mitchell, Lancaster, N. H., assignor of two-thirds to James A. Smith and Alden R. Tinkham, both of same place. Filed June 12, 1883.
285,158. STATION-INDICATOR: Isaac Newton Phillips, Nashville, Tenn. Filed Jan. 9, 1883.
285,173. CAR-SIGNAL: Isaac W. Stemen, Elida, Ohio. Filed March 1, 1883.
285,181. CAR-COUPLING: Savage D. Trenholm, Charleston, S. C. Filed July 6, 1883.
285,190. RAILWAY-SWITCH: John C. West, Clarksville, Mo., assignor of two-thirds to Otis N. Baldwin, same place. Filed May 17, 1883.
285,196. COMPOUND RAILWAY-RAIL: Noah D. Wright, Covington, Ky., assignor of three-fourths to Edwin R. Seely and John H. Gurney, both of same place. Filed April 23, 1883.
285,217. CAR-AXLE BOX: Russell Brewer, New York, assignor of one-fifth to Gottlieb Engels, Brooklyn, N. Y. Filed March 29, 1883.
285,219 SEAL-LOCK FOR CAR-DOORS: Edward J. Brooks, East Orange, N. J., assignor to E. J. Brooks & Co., New York, N. Y. Filed June 25, 1883.
285,228. CAR-COUPLING: Josiah P. Champion, Phelps, N. Y. Filed June 18, 1883.
285,242. SPIKE-PULLER: Keyran J. Duggan, Montgomery, Ala. Filed June 21, 1883.
285,247. CAR-COUPLING: Bevly A. Fisher, St. James, Mo. Filed June 12, 1883.
285,257. SUSPENSION-BRIDGE: Thomas F. Griffith, Arlington, N. J. Filed Aug. 2, 1882.
285,258. GRAIN-CAR-DOOR MECHANISM: John A. Hagan, Three Rivers, Mich., assignor of one-half to the Sheffield Velocipede Car Company, same place. Filed Feb. 27, 1883.
285,262. CAR-COUPLING: Clarke Hendricks, Modesto, Cal., assignor of one-half to J. R. Fenn, same place. Filed June 7, 1883.
285,271. STEAM-ENGINE: Amariah W. Jackson, Chicago, Ill. Filed July 11, 1883.
285,289. STATION-INDICATOR: Fred C. McDonald, St. Louis, Mo. Filed Oct. 25, 1882.
285,340. DISINTEGRATING-HOPPER FOR DREDGERS AND EXCAVATORS: John A. Ball, Oakland, Cal. Filed July 23, 1879.
285,352. RAIL-DOG: Jas. Findlay, Toronto, Ontario, Canada. Filed Oct. 10, 1882.
285,356. RAILWAY-SWITCH STAND: Alonzo Grinder, Altoona, Pa. Filed May 17, 1883.
285,364. CAR-LAMP: Louis W. Schaefer, Brooklyn, N. Y. Filed July 21, 1883.
285,366. STEAM-BOILER FURNACE: Byron Sloper, New York, N. Y., assignor to himself, Walter M. Jackson, and Lyman A. Cook, both of Providence, R. I. Filed July 28, 1883.

BEARING DATE SEPTEMBER 25, 1883.

285,373. SPIKE: William H. Bailey, Minneapolis, Minn. Filed February 26, 1883.
285,380. REVOLVING CAR-SIGNAL: Albert A. Bissell, Joliet, Ill., assignor of one-half to Edward R. Knowlton. Filed July 14, 1883.
285,394. REFRIGERATOR-CAR: Edwd. Z. Collings, Camden, N. J., and Chas. F. Pike, Philadelphia, Pa. Filed Oct. 20, 1882.
285,399. NUT-LOCK: William B. Eltonhead, Philadelphia, Pa., assignor, by direct and mesne assignments, to the United States Lock Company, (Limited,) same place. Filed Feb, 23, 1883.
285,406. RAILWAY RAIL-JOINT: William F. Gould, Stuart, Iowa. Filed Oct. 28, 1882.
285,419. CAR-COUPLING: Francis H. Leonard and Stephen D. Snow, Boston, Mass. Filed June 11, 1883.
285,432. LUBRICATOR: J. Vincent Renchard, Windsor, Ontario, Canada. Filed March 3, 1883.
285,433. CAR-SEAT: Arthur M. Richards and Edward Dinsley, Chicago, Ill. Filed Sept. 9, 1881.
285,453. STEAM-BOILER HEATER: Henry M. Young, Minneapolis, Minn. Filed July 26, 1883.
285,465. LUBRICATOR: Michael L. Conway, San Francisco, Cal., assignor of two-eighths to John Broderick and John A. Hamilton, both of same place. Filed July 3, 1883.
285,473. CAR-COUPLING: Aldridge C. Ellis, Birmingham, Mich., assignor of one-half to Horace A. Randall and George F. Randall, both of same place. Filed May 10, 1883.
285,497. APPARATUS FOR OPERATING SEMAPHORE SIGNALS: William W. McLellan, New Castle, New Brunswick, Conn. Filed April 14, 1883.
285,498. INJECTOR: James H. McPhail, Boston, Mass., assignor to the National Tube Works Company, same place. Filed March 23, 1883.
285,499. STATION-INDICATOR: Thomas Melrose, San Francisco, Cal. Filed June 13, 1883.
285,500. CUT-OFF-VALVE GEAR: Herman H. Meyer, Denver, Colo. Filed March 30, 1883.
285,507. CAR-BRAKE: J. Curtis Patterson, Philadelphia, Pa. Filed Feb. 10, 1882.
285,509. CAR-AXLE: Amos T. Peirce, Fairhaven, Mass. Filed July 2, 1883.
285,511. RAILROAD-CROSSING: Denison C. Pierce, Chicago, Ill. Filed Nov: 3, 1883.
285,571. ALARM-SIGNAL FOR RAILWAY-TRACKS: Jos. Clark, Green Point, N. Y. Filed Feb. 5, 1883.
285,589. RAILROAD-SIGNAL: William L. Doyle, Buffalo, N. Y. Filed Dec. 14, 1880.
285,616. CAR-COUPLING: Charles L, Hathaway, Austin, Tex. Filed July 7, 1883.
285,641. RAIRLOAD-RAIL CHAIR: John McMurtry, Lexington, Ky. Filed July 22, 1882.
285,647. FROG: William J. Morden, Chicago, Ill. Filed April 27, 1883.
285,657. STREET-RAILWAY STRUCTURE AND CAR THEREFOR: Orel D. Orvis and Nelson B. Adams, New York, N. Y. Filed June 23, 1883.
285,662. RAILWAY-RAIL LOCK: Jas. Patterson, Brooklyn, N. Y. Filed April 13, 1883.
285,671. RAILWAY-TORPEDO: Walter S. Phelps, Wortendyke, N. J. Filed Dec. 28, 1882.
285,675. RAILROAD-CAR: John W. Post, New York, N. Y. Filed July 26, 1883.
285,678. CAR-SEAT: Arthur J. E. Readio, Pawtucket, R. I. Filed Feb. 21, 1883.
285,680. CAR-COUPLING: Joel Frank Rice, Louisiana, Mo., assignor of two-thirds to W. H. Merrow and Joe Block, both of same place. Filed Aug. 9, 1883.
285,688. RAILWAY SPLICE-BAR: Morris Sellers, Chicago, Ill. Filed June 23, 1883.
285,698. CAR-MOVER: John Spengler, Clarion, Iowa, assignor of one-half to Nicholas Francis Weber, some place. Filed Aug. 10, 1883.
285,700. SAND-GUARD FOR RAILWAYS: Timothy W. Stapleton, Portland, assignor to John G. McBride, Portland, Oreg. Filed May 5, 1883.
285,701. CAR-COUPLING: Mark L. Sterling, Denver, Colo. Filed Aug. 15, 1883.
285,722. CAR-COUPLING: Christian H. Zimmerman, Le Roy, Ohio. Filed July 6, 1883.
285,737. SLIDE-VALVE; Riley Doty, Leonardsburg, Ohio. Filed July 6, 1883.
285,758. CAR-COUPLING: Isaac Kling, Louisville, Ky. Filed June 18, 1883.

Orne's Patent Car-Axle, with Independent Wheels.

THE car-axle with independent wheels, supplied by Edward B. Orne, No. 3,935 Locust street, Philadelphia, is intended to overcome the resistance of car-wheels by their circumferential slipping in going around curves of railroads. It is made of few pieces, and it combines strength, simplicity and reasonable cost.

It is composed of the axle, which is made in three sections and surrounded by the hub. This is made in two horizontal half-round pieces. When these two halves are together, inclosing the axle, they are pressed by power into the wheel, which is bored correspondingly large to receive it. The end sections are steel, and revolve only with the wheel and hub. The middle section is wrought-iron pipe, four inches outside diameter, and one inch thick in the walls. The interior of the pipe is used as a reservoir for lubricant, which is fed to the inside bearing of wheels. This middle section keeps the wheel to gauge, and brass washers between the middle and end sections take up any wear at this place. The arrangement described allows each wheel to move independently when rounding curves, and when running on straight line, both wheels and axle revolve together, which reduces the wear to a minimum.

A letter written by H. Stanley Goodwin, general superintendent for the Lehigh Valley Railroad Company, to Mr. Orne, dated September 3, 1883, gives a detailed account of the performance of the Orne Car-axle, in a concise and interesting manner. The writer says:

"I give you below the result of a test made to-day with our eight-wheel gondola car No. 6,386, fitted with axles upon which all of the wheels are loose, fitted under your direction and in accordance with your drawings.

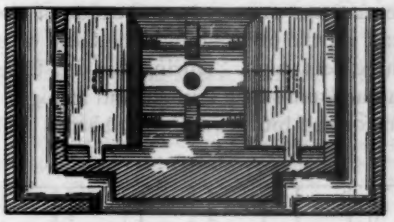
"This car was given a free run along with a car of similar build in all respects, except that the other car had wheels fast upon the axles, and of the usual construction.

"Your loose-wheel car was loaded with 40,080 pounds of old scrap-iron, and the fast-wheel car was loaded with 40,080 pounds of old wheels. Both these cars were loaded three weeks since for the purpose of this test, and have remained loaded from that time. The place where the test was made is on the up-track siding next above Bethlehem Station, and the line from the starting point is as follows: First a curve with a radius of 997 feet for a distance of seven rails; thence a straight line of three rail lengths; thence a curve to the right with a radius of 764 feet, for a distance of 24 rail lengths, making a total of 47 rail lengths from starting point; thence a tangent of five rail lengths and thence a curve to the left with a radius of 1,207 feet to a point beyond the farthest point reached in the test. The grade of this track for the whole distance is nearly uniform, and at the rate of about $\frac{227}{100}$ feet per mile, and may be called practically level. Both these cars are gondolas of L. V. R. R. standard pattern, and both built with center bearings which hold the body clear from any side bearing.

"The tests were conducted as follows:

"First: With the fast-wheel car ahead and the loose-wheel car behind, the cars not being coupled. An engine gave them a push and they ran close together a distance of 47½ rails; and again in the same manner a distance of 56 rails, and stopped touching each other; the loose-wheel car bumping the fast-wheel car from time to time during the runs. The cars were next shifted, and the loose-wheel car was placed ahead with the rigid-wheel car in the rear, and the two were pushed in the same manner as before. On the first run, the loose-wheel car ran 69 rails, and the fast-wheel car 58 rails; on the second run, the loose-wheel car 69 and the fast-wheel car 58; on the third run, the loose-wheel car 70 and the fast-wheel car 60; fourth run, loose-wheel car 45, fast-wheel car 39½; fifth run, loose-wheel car 45½, fast-wheel car 39½. The testing was then discontinued."

Calver's Balanced Slide-Valve.



TIMOTHY CALVER, of Portsmouth, Ohio, is the patentee of this invention, of which the accompanying cut is a transverse sectional elevation showing the valves, which are arranged in duplicate within the steam chamber, and are connected together by right and left threaded bars, so as to be laterally adjustable, and to provide for the wear of the working parts. The ends of the yoke rest loosely in slots or openings made in the inner faces of the valves, so that they may slide for lateral adjustment. This arrangement also connects the two valves so that they will reciprocate in unison, by means of the valve stem whose inner end is attached to said yoke in any suitable manner. The tongues or ribs on the under side of the valves are intended only to relieve the friction as much as possible.

In employing the two valves and two sets of steam ports in the steam chamber, the effect of the steam upon the valves is uniform, and it can be admitted to the cylinder and exhausted therefrom in greater volume.

Mr. Calver's leading claim is: In combination with duplex slide-valves cut away to give a minimum bearing upon the seat, right and left threaded bars or screws connecting said valves, and means of adjusting said screws to take up loss by wear.

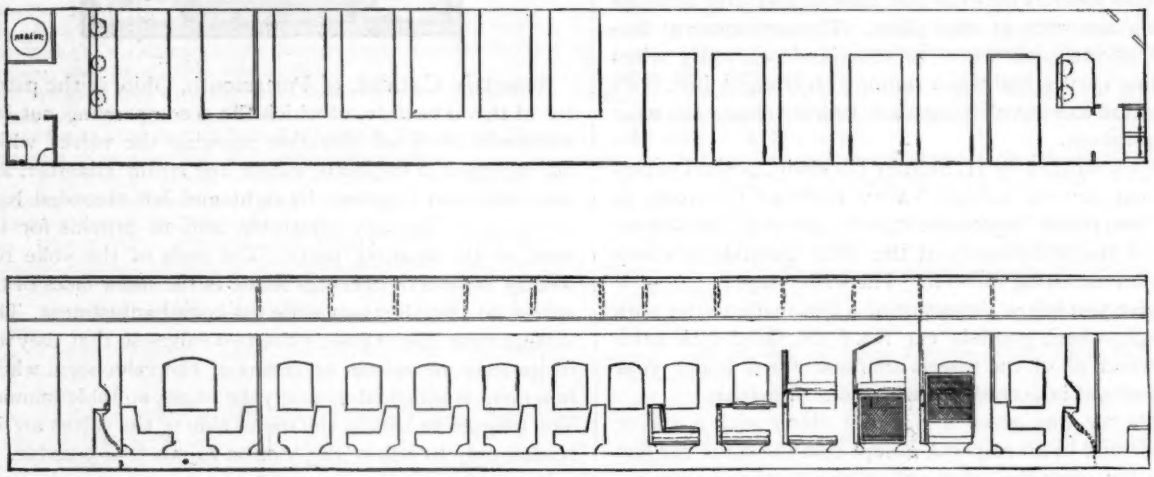
A New Nut-Lock.

MR. JOHN PARR, of Humboldt, Nebraska, is the inventor and owner of a nut-lock, Patent 288,114, which is a simple invention. It consists of a plate of malleable iron with holes in it the size of the bolts to be placed on it. The bead-plate is bent outwards the thickness of the nut it is to be used on, and then it projects upwards at the side of the nut, from a quarter to half an inch, according to the size of the nut, with open spaces along it for each nut to be put on or taken off. The bead-plate is made from one-eighth to one-quarter of an inch lower than the nut it is to secure, to admit the passage of a straight key to pass under the nut and throw the flange off the bead-plate. The nut-lock can be made to fasten one or more nuts at a time. The invention was made expressly for the rail-joint providing that one plate and one key will lock the four nuts.

A Revolution in Sleeping Cars.

PROMINENT railroad men just now are showing much interest in a novel invention by John A. Sleicher, formerly one of the editors of the Troy, N. Y., *Times*. He has patented in this and other countries, what he calls a "State Room Sleeping Car." By a very novel but simple device he so transposes the seats at night as to make a comfortable state room of each section. The explanation of the invention is briefly as follows:

Each seat is six feet long and extends from one side of the car to within about 2½ feet of the other. The aisle are thus left at the side of the car instead of in the middle. Half of the seats are arranged on one side of the car and the other half on the other side. The back of each seat is about three feet high. During the day-time the seat looks like a handsome easy lounge, and at night it can be quickly transformed into two roomy berths. The lower berth is the seat itself. To make it the necessary width for sleeping purposes, the seat and seat back are turned up into a horizontal position, leaving the full width of the seat underneath exposed. It is three feet wide and forms a comfortable lower berth. The upper berth is made of the seat-back and seat itself as they lie turned up into a horizontal position, affording a width of fully three feet. Under the seat during the day-time are two mattresses, or wide cushions, lying upon a spring-bottom. One of these mattresses is thrown upon the upper berth to make a comfortable bed, while the other, left upon the spring-bottom underneath, makes an admirable lower berth. The berths, it will be seen, extend transversely across the car. The ingenuity of the inventor is further displayed in the storage of the pillows, blankets and curtains in the space left behind the seat-back when it is turned down during the day-time. The advantage of complete isolation for each section is obtained by means of sliding panels or double backs to the seat-frames. These panels when elevated, form, in connection with projections from the roof, partitions, across the width of the car and thus leave each section of two berths snugly cut off from the others. A passenger in his own state-room can enjoy the great luxury in a sleeping car of standing erect by the side of his berth and preparing at his leisure without fear of intrusion, for his night's rest. Travelers, especially ladies, who have ventured into an ordinary sleeping car and tried at night to disrobe while half reclining, half standing, in the public aisle, jostled by every passer-by, will appreciate the special advantage of the state-room car. The inventor claims it is more comfortable to sleep across the car than lengthwise of it. He has sought also to render travel safer. His car certainly embodies precautions of value in the matter of safety from fire. In the first place, the heater is inclosed in a compartment near the door at one end of the car. This compartment is lined with boiler iron on all sides. The stove might be broken to pieces, yet the burning coals could reach nothing inflammable. As a further and very important safeguard, the water-tank in the gentlemen's toilet room extends across the car directly beyond the heater. It reaches almost from the roof to the wash bowls, and the water runs by gravity. In case of a collision or wreck, it is claimed that the bursting of this superimposed tank would flood the car, especially the part near the heater. No kerosene will be used in the new car, as wax candles or gas will furnish the illumination. Railroad men say that one of the most important and valuable points about Mr. Sleicher's car is the absence of the ponderous upper berths, which in ordinary sleepers are swung up into the roof and there held by heavy springs or weights. The Sleicher car is at least 5,000 pounds lighter than a Pullman or a Wagner car of the same size, and much easier to ride in as the weight is all near the floor, and not upon the sides or roof. The inventor claims a saving of over 25 per cent. in the cost of building one of his cars in the highest and most artistic style, compared with the cost of an old-fashioned sleeper, and yet his car will accommodate about the same number as a Pullman or Wagner car of equal size. The economy in weight is a vital matter. Sleepers, as now built, are so heavy that a locomotive can draw but few of them in one train. The inventor has been in consultation at the St. Nicholas Hotel with several capitalists, who are much interested in the new invention. All concede that it has decided merit and value. Mr. Sleicher is at present in charge of the New York State associated press office in this city, with headquarters at the Western Union building.



SLEICHER'S SLEEPING-CAR.

The cuts at the head of this article show first a ground plan of a state-room sleeping car, and second, a sectional view of the car.

The first cut shows the arrangement of the seats and aisles, with the gentlemen's toilet at the left adjoining a smoking compartment, and the ladies' toilet apartment on the extreme right.

The second cut shows at the left the seats as they appear from the aisle. On the right, the ingenious process of changing the seats into berths is displayed. It will be seen that the supports for the upper berths (which supports, in the day-time, lie folded under the seat-cushions) are covered with wire netting to protect the occupants of the berths from intrusion. The panel rising from the seat-back, and with its spring flap forming a partition between the sleeping sections, is also clearly shown. Each section has its own ventilators at the side of the roof, which can be opened or closed by the occupant.

It strikes us as very strange that these simple devices for making a sleeping car perfect in all its appointments, were never thought of before. It will be stranger still if "the state room sleeper" does not, within a short period, supplant the ill-ventilated, top-heavy, uncomfortable coaches that have so long been tolerated by a patient and submissive public.

Rowing for Health.

IT is agreed by all competent authorities who have made the study of health and its laws a special field for observation and inquiry, that foremost among the exercises for physical development, rowing occupies a prominent place. Indeed it is a question whether there is any other system of exercise which will compare with it, and the highest types of physical development have been seen among those who have been dextrous with the use of the oar. While the class of professional rowers is a large one, and the athletic spirit which now is so strong in all ranks and classes of society, is having the effect of constantly making accessions to it, yet the catalogue comes far from showing the vast number that are "paddling their own canoe" for health and recreation. Comparatively few, however, can enjoy the privileges of the boat and the water, and occasional or spasmodic turns at the oar do more harm than good, for the trouble is that those unable to boat but infrequently, go at it so violently that they strain and overexert themselves, on the principle that they must "make hay while the sun shines," and they receive more harm than good. It follows, therefore, that to receive the greatest good, a course of regular or systematic exercise must be followed.

There is a great variety of devices and mechanical appliances of varying merit, for supplying the public with the means of exercising "at home," for the average person is unwilling, and oftentimes unable to take the time and trouble of exercising regularly, unless the means are at his own door. It is an easy matter to form plans and good intentions for systematic exercise, but so long as human nature is constituted as it is, the proportion of those carrying them out will be about the same as with that large number who, at the beginning of the year start to keep a diary, the reader doubtless has had some experience in that line, and can therefore form a correct estimate of the successful number.

Among the many machines and gymnastic apparatus which have come under our notice, we are not aware of any which appears more sensible and practical than the invention of Professor J. M. Laflin, 266 Broadway, this city. It may be described as a home rowing machine; we shall permit the professor, however, to explain the machine, and what he claims for it in his own language:

"I am now enabled to offer my patrons and customers a Perfect Parlor Rowing Apparatus. After spending thousands of dollars, and years in experiments, with the combined help of the best mechanical engineering talent, I have produced a perfect and simple device which will not break or get out of order, as has been the trouble in my former and all other apparatuses. In my improved machine there are no springs, as the pressure is regulated exclusively by friction, and can be varied by an adjusting thumb-screw, from one ounce to 1,000 pounds, at the will of the operator. The clutching or gripping device to which the oar is attached, is simple and positive in its movements, and allows the operators to rest their hands upon the oars, and feathering same when coming back in the same manner as ordinary rowing. As each oar is provided with an independent friction, the operator can let either oar rest and apply both hands to one oar, and pick up the other at any time again. And I have so arranged the machine that by changing the out-rigger and oars about on the frame, the pushing of the oars may be practised similar to the style of the Norwegian sailor, which is the best exercise for developing the muscles of the back and stomach. To show the confidence I have in my machine, I will warrant it for five years. Each machine is provided with a counter or indicator, which is so graduated that one revolution of the dial is equivalent to one-quarter of a mile as calculated from Hanlon's time, thirty-two strokes per minute, and which will be found of great benefit in regulating the time spent in this exercise."

A few of the good features of this rowing machine are that it is inexpensive, takes but little room, and being light, can be moved from place to place at pleasure.

Circulars and full information, together with a pamphlet on Physical Culture, can be had on application, by addressing J. M. Laflin, 266 Broadway, New York City.

The Minnesota Steam Scraper.

VINE D. SIMAR and John Dale, of St. Paul, are the inventors of this machine, which is said to do its work more quickly and more effectively than an ordinary steam shovel, and can be built or purchased at about one-half the cost. Being constructed on the dredge plan, there is no loss of time in lifting the dirt, as it operates continuously. It is a sort of a drag-scraper on wheels, run by steam power. The scraper arm is twenty feet in length, and has six scrapers attached to an endless chain. The movement of these scrapers carries the dirt to an elevator that has combined cutters and buckets. This elevator takes the dirt carried to it by the scrapers, and also picks up the dirt which is scraped toward it, but is not actually carried in the scrapers themselves. At the top of the elevator there is a chute which delivers the dirt anywhere within a radius of twenty feet. The new scraper handles its work with great facility, as it is mounted on a turn-table, so that the scrapers can work all around the point where it stands. The scraper-arm can be raised or lowered, so that it can be worked below grade. In widening a track it can be put at right angles to the track, the arm run out to the bank, and the dirt carried directly on to a cart placed in the rear of the elevator. On prairie roads it can be so worked as to borrow from either side and put the dirt right on the embankment. It is not expensive to work. Ordinarily the engine and boiler of a steam shovel weighs from 5,400 to 5,700 pounds. This scraper is rigged with a boiler and two upright engines that only weigh, in all, 2,700

pounds, yet are so geared as to furnish twenty-four horse-power. The use of two engines does away with the necessity of a fly-wheel, as there is no dead center to overcome.

Improvements in Wire Suspension Bridges.

On the eighteenth of September last a patent was granted to Thomas M. Griffith, engineer of the New York Wire and Wire Rope Company, office No. 2, Astor House, for improvements in wire suspension bridges. Said improvements are deserving of particular mention.

The suspension bridge is a very ancient device, having been known in China at an early date, and later in South America, where it was constructed in a rude way of a species of vine for the passage of pedestrians and animals. In later times, engineers have made efforts, with more or less success, to adapt the principle of suspension to the requirements of modern locomotion, and to render these vibratory structures stable and free from vibrating motion. Various means have been adopted for this purpose. The bridges have been made heavy in proportion to the load they were to carry. They have been stiffly trussed, and an English engineer, a Mr. Dredge, has applied a system of diagonal rods. Stays reaching from the top of the tower to the platform, and called floor-stays, have been adopted. Some of these experiments have partially accomplished their purpose; others of them have proved comparatively useless.

It is important not only for the better accommodation of travel, but for the security of a suspension bridge, that the platforms shall not be allowed to vibrate greatly, as by so doing, after a certain point of vibrating motion is reached, the platform and cable will not vibrate in unison. Owing to the larger surface of the first in comparison to its weight with the last, it must fall more slowly than the cable, and at those points half way between the center of the bridge and the towers or points of support, where the motion is the most violent, the suspension rods will be broken. When a few are broken, the destruction of the bridge is almost certain to follow, and a number of suspension bridges have been injured or destroyed in this way.

It is the aim of Thomas M. Griffith to overcome by his patented improvements both of the defects, indicated, and also to cheapen the cost of wire suspension bridges.

The essential features of his invention are: the placing of spars between the platform and cables, at and near the quarter points of the span, and from the foot of each carrying a floor-stay over an independent saddle on top of the tower, down to the anchorage; the placing a cushion of rubber or other elastic material between the ends of the platform and the masonry of the towers, and firmly securing the cable to the platform along the middle. It will be seen that when a passing load reaches the quarter, there will be a tension upon the floor-stay and a compression upon the rubber cushion which will materially assist in supporting the quarter.

TUBULAR TRUSS AND TOWER SUSPENSION BRIDGE.

Again, in case the platform is shaken by a storm, and when the quarters at either side of the center are alternately rising and falling, the device described will check such motion, and the spars will compel a uniform motion of the cables and platform, rendering it impossible for the suspension rods to become slack, and consequently avoiding the possibility of a jerk. It will be seen that a very light suspension bridge may be made quite secure by these appliances, and that however violent the motion may become, there may be a reasonable hope for the safety of a structure which without them would be certain of destruction.

Another feature of the improved Griffith bridge is, that the floor planks are made quite narrow and slightly separated from each other, and the edge of the same chamfered so as to relieve the platform of upward lift by wind, in the same manner as a banner suspended across a street is relieved from the danger of being lifted and whirled over, by piercing it with a few holes to allow the wind to pass through it and relieve the pressure upon it. These devices may be placed upon any suspension bridge, light

or heavy, and upon those having any kind of trusses.

But the Griffith inventions go further, comprehending a novelty in bridge construction which in many localities, is very desirable.

All of the improved bridge is made of small pieces which can be easily transported from the factory to the proposed site; and it can be speedily erected by ordinarily intelligent labor, directed by one or two skilled persons. The towers and trusses are made of wrought iron tubes connected by couplings, and braced by tension rods.

This style of bridge would undoubtedly be useful for street car lines or in places where cars will be driven by electricity, which recent experiments in New Jersey have demonstrated to be practicable.

Heretofore, suspension bridges have been regarded as expensive structures, but Mr. Griffith claims that with his improvements they can in many cases compete in cost, safety, and durability with other bridge structures, while they are certainly light, graceful, durable and elegant. Their strength may be proportioned to the kind and quantity of travel required.

We observe that Mr. Griffith's name appears among the engineers who have built the finest suspension bridges in the world. He was associated with S. Keifer as assistant engineer in the construction of the bridge over the Niagara Falls, and was the engineer of the first Minneapolis bridge, Oil City foot-bridge, the fine bridge at Waco, Texas, and that eminently beautiful structure, the new suspension bridge at Minneapolis.

Smith's Ash-Pan for Locomotives.

LOCOMOTIVES are at present supplied with an ash-pan for catching the cinders and ashes as they drop from the grate bars, the said ash-pans being made with a solid bottom, and the cinders and ashes remain within the pans until they are taken into the repair shop and cleaned. The cinders are then left at the side of the track until a sufficient quantity accumulates, when they are shoveled into a train of flat cars and hauled away for ballasting some part of the road bed. When running through snow and snow-drifts, the pan catches up the snow, which, mixed with cinders and ashes, freezes and forms ice, which fills up the front of the ash-pan and prevents proper draft to the fire in the fire-box, and often necessitates the stopping of a train that it may be removed.

The object of the invention made by C. F. Smith, of Bay City, Michigan, is to provide an ash-pan that may be emptied at any point along the road while the train is in full motion, and at the same time distribute the ashes and cinders without extra expense or labor; also, to provide a device by means of which the snow and ice can be thawed out by hot water from the boiler, and at the same time wash out the bottom of the ash-pan and quench any fire that may have dropped into the ash-pan from the grate-bars.

It consists, mainly, in an ash-pan constructed with a number of leaves, so arranged that when closed or placed in a horizontal position they form a closed level bottom for the ash-pan, and when tilted they allow the contents thereof to drop between and fall to the ground; also, an arrangement of a pipe so constructed as to allow a number of jets of hot water and steam from the boiler to flow over these leaves or the bottom of the ash-pan, for extinguishing the fire and thawing out the snow and ice accumulated therein.

Device for Oiling the Guides of Upright Engines.

CLEMENT SMITH, of Lancaster, Pennsylvania, has sent us the following interesting communication:

LANCASTER, PENNSYLVANIA, Sept. 19, 1883.

Messrs. Phenix Publishing Company, No. 245 Broadway, N. Y.

GENTLEMEN:—Some months ago I completed a small yacht engine, and had it running in my shop on trial. It had, like numbers of small engines in the market, neither oil cups or drip cups for the guides. I had it running but a short time before I found out that the guides were constantly becoming dry, and once, while I was attending to something else, they cut so badly that I had great trouble in getting the marks out.

It seemed to me, that if I could devise something that would keep the guides constantly oiled, and at the same time neither be liable to waste the oil nor stop feeding, it would be a great advantage over the oil cups now used. I at length hit upon the following contrivance, which has been working to my entire satisfaction on the vertical engine that runs the shop. In the center of the lower end of each cross-head shoe, I screwed a wire about 3-16 of an ihch in thickness, and of sufficient length to reach nearly to the bottom of a couple of drip cups, at the lower ends of the guides. The wires were bent so as to just graze the guides. Now, if oil is poured into the drip cups, at every down stroke the wires attached to the shoes, or gibs, of the cross-head will dip into it, and at the up stroke deposit a small quantity on the guides as they pass over them. After the engine has run a few moments the guides will be saturated with oil. In order to secure the superfluous oil from being wasted, the guides should be cut under at the bottom, so it will drip back into the cups. Thus you perceive that the same oil may be used over and over again, without any waste. When the engine stops, the oil drops off from the guides into the cups, and is ready for use at a moment's notice. The cross-head gibs should have grooves on their faces in the shape of inverted V's. The grooves should meet just under the dip wires, thus having a tendency to spread the oil over the surface of the guides. I remain yours truly,

CLEMENT SMITH.

Noiseless Car Wheels.

AN invention having reference to an improvement in wheels for railroad cars is of equal importance in the making of light wheels for horse-cars. Its design is to prevent what the inventor calls "the jar and hum" of the car wheels now in use.

The philanthropic inventor, for whom numberless "God bless you's" are in store, provided his device is found to be practicable, is James M. Whiting, of Providence, Rhode Island, assignor of one-half of his patent rights to James Carroll and George C. Elliot, of the same city. His improvement consists in a peculiar and novel construction, by which the jar of the wheel is deadened, and a limited amount of elasticity is secured in it, and combines, with a cast-metal spider, separate cast-metal blocks, one between each two arms of the spider, elastic material between the spider and blocks consisting of india-rubber, rawhide, prepared paper, or any similar material, and the tire which embraces and holds all the blocks in position.

It is obvious to mechanics that the parts may be secured together in various ways.

A WRITER in the *Century Magazine* says that the twenty-two thousand acres of New York City, included on Manhattan Island, only brought the Indian proprietors about twenty-four dollars in the year 1626; a township in Maine was purchased for a hogshead of corn and thirty pumpkins; and an extensive tract in Woodbury, Connecticut, was long called Kettletown, from the fact that it was bought for a brass kettle.

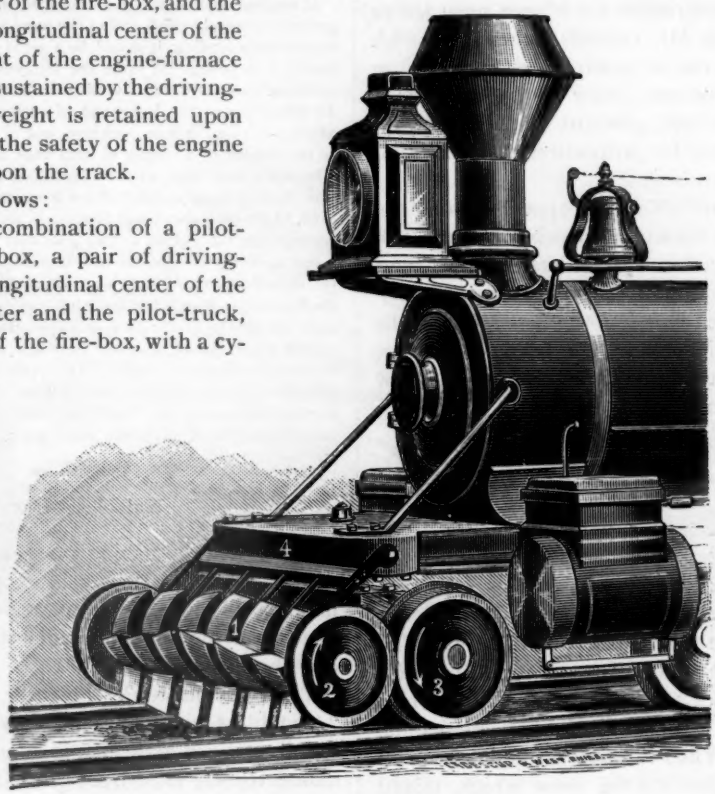
The Daniel R. Murphy Locomotive.

DANIEL R. MURPHY, of Newark, Ohio, has taken out a patent on his newly-invented locomotive, which his friends claim will pull a larger train and at a greater speed than any locomotive now in use. The principles of its construction are increased weight on the drivers and an enlarged heating surface. Mr. Murphy has assigned one-half to Gurdon B. Johnson, of Granville, Ohio.

In the Murphy locomotive, the steam-cylinders are placed between the driving-wheels, and has for its object the proper relative distribution of the weight upon the pilot and driving-wheels. The major portion of the weight is sustained by the driving-wheels, one pair thereof being placed in the rear of the fire-box, and the other pair in front of the longitudinal center of the boiler, whereby the weight of the engine-furnace and its appurtenances is sustained by the driving-wheels, while sufficient weight is retained upon the pilot-truck to insure the safety of the engine while rounding curves upon the track.

The claim reads as follows:

In a locomotive, the combination of a pilot-truck under the smoke-box, a pair of driving-wheels in front of the longitudinal center of the boiler, between said center and the pilot-truck, and one pair in the rear of the fire-box, with a cylinder equidistant from said driving-wheels, and having a piston therein, provided at each end with a piston-rod, a cross-head, a connecting-rod, and the crank-pin, projecting from the driving-wheels, whereby the weight of the locomotive is distributed upon the pilot-truck and the driving-wheels, and the latter are revolved together.



LAKE'S COW-CATCHER.

Lighting Cars by Electricity.

GEORGE D. BURTON, New Ipswich, New Hampshire, is the inventor of an improvement in apparatus for lighting cars by electricity, by means of which not only the exterior and interior of the train, but the track in advance of it, are adequately illuminated. He has secured letters-patent protecting his invention.

In Mr. Burton's system of electrical lighting, the locomotive carries an electrical generator and actuating engine for it, driven by the steam from the locomotive boiler, one terminal of the said generator being connected with the wheels, and through them with the rails of the track, which forms a ground or return-circuit wire. The other electrode is connected with the wire circuit including the various lights. One light is placed at the front of the locomotive, serving as a head-light, and another one is placed on the cab, with its rays directed backward to illuminate the exterior of the train, while each car is provided with a light for illuminating its interior. Each car is provided with a permanent conducting wire inclosed in pipes running along the top of the car, and each car is provided at each end with a grounding wire passing downward through a pipe at the side of the car to a spring or brush in contact with one of the wheels. Connecting wires are used between the cars for continuing the circuit from the permanent wire of one to that of the next car, and at the rear of the train the permanent wire along the top of the car is connected with the grounding conductor at the side of the car, thus completing the circuit to the wheels and axles and rails; and back to the other electrode of the generator connected therewith. The lamps within the cars have their electrodes included in the circuit of the permanent wire along the top of the car, and are suspended by springs in a suitable frame-work connected with the car, so that the vibrations of the car will not be transmitted to the lamps.

Lake's Cow-Catcher.

THE operation of this invention, patented by E. B. Lake, Ocean City, Cape May County, New Jersey, is substantially as follows: The cow-catcher is hinged fast to the frame (4) of the locomotive, and can be raised or lowered so as to bring the spur wheels (1) and friction wheels (2) as near the track as may be desired. The friction wheels (2) at the same time rest upon and against the pilot wheels (3), so that when the engine is in progressive motion the pilot wheels (3) revolve in the direction shown by the arrow, causing the shaft carrying spur wheels (1) and friction wheels (2) to rotate in the opposite direction as shown by the arrow.

The spur wheels (1) are of such radii that their points when in the lowest position of their revolution are on a plane with the tops of the rails on which the pilot wheels (3) run, or as much below or above as may be desired. Said spur wheels (1) are beveled, those on the right of center inclining or sloping to that side, and those on the left of center inclining to that side. Thus everything found on the track and struck by the cow catcher will be thrown to the right or left; and should the cow-catcher come in contact with a cow or other obstruction on the track, the spur wheels (1) will throw it upward and outward, thereby avoiding the danger of derailing the engine, or throwing it or the train from the track.

ADVERTISE in the AMERICAN RAILROAD JOURNAL.

Blessing's Steam Pump.

A RECENT invention of James H. Blessing, Albany, New York, treasurer and secretary of the Albany Steam Trap Company, relates to an apparatus for avoiding or diminishing the jar or concussion occasioned by the operation of steam pumps; and it consists in an apparatus by means of which the movement of the water is gradually started and stopped at each end of the stroke.

The steam cylinders used in the improvement are of the common three-posted kind. A pump cylinder and four pistons connected in pairs together by their own rods, are all the additional parts necessary to mention in the attempt to describe Mr. Blessing's invention.

The combined area of the pistons shown being stated as 100 and the area of the outer one two-thirds greater than the inner one, and the combined areas of the water end one-half the combined areas of the steam end, namely, 50; and the area of the outer piston to be ⅓ greater than the area of the inner one, they are so proportioned as to insure the moving of the small or inner first, or ahead of the outer when the steam is first admitted, commencing its stroke. The two small pistons are connected together by a rod inside of the hollow rod that connects the two outer pistons, and the operation is as follows:

When, the pistons being in position, just beginning the stroke, and the water end of the apparatus filled with water, the steam has entered the space between the cylinder head and the steam piston, the pressure will first act on the small piston to move it, and the proportionate area between the two small ones being greater than the two large ones, it will continue to move in this direction until stopped by the head or closed end of the piston. In the meantime the small piston in the water end has been forced towards the open end of the large water piston, and finally comes to rest when its outer face is even with the face of the large water piston.

During this operation the water in the small cylinder has been forced out into the large cylinder, filling any vacant spaces there may be, and also filling the discharge passage and lifting the discharge valve from its seat. Now, as it were, both pistons become solid and move together until one end of the rod connecting the two small pistons comes in contact with the head of the pump cylinder, thus preventing the small pistons from moving any further in this direction, the large ones continuing on till they have completed their full stroke. It will now be seen how the discharging valve will be allowed to drop quietly on its seat; first, by reducing the volume of the discharge water gradually to one-half of its volume, and again by the small piston commencing its return stroke ahead of the large one. Also the velocity of the large pistons is further reduced from the fact that when moving all together, their combined areas are as 100 is to 50; after the small pistons have come to a state of rest and the large ones are completing their stroke, they are then acting as 66.66 is to 37.50. The result is that the velocity of the water at the last end of the discharge, as well as at the commencement, is so far reduced that the valves are quietly and without shock allowed to drop and be lifted from their seats.

A CAR shop at York, Pa., has built fifty cars for Costa Rica.

The Frances Registering Machine.

THIS ingenious invention, manufactured by the Frances Registering Machine Company, No. 194 Washington street, Boston, can be applied to any machine which has a motion. It will register accurately from 1 to 1,000,000, and can be easily adjusted from the number last used to the starting point at Number 1. It has no complicated parts to wear or get out of order, and is claimed to be the most simple and accurate registering device offered on the market for the price. It is used in connection with ale and beer faucets, to record the number of glasses drawn. When supplied with a lock, no person can tamper with it.

The machine is constructed as a conductor's register for steam and horse railways. For this purpose it is made smaller in size, and numbers from 1 to 500. At each number registered the indicator moves one place in the presence of those who may be near, and at the same time a bell rings, indicating that the number has been recorded.

THE Car-Coupling patented by A. A. Stetson, Florida, Missouri, requires draw-heads eight inches deep and three inches thick, with inclined point and vertical walls three inches deep, beginning at the upper point of incline and running back eight inches. The latches are two and a half round iron, are hinged on the car-frame, and lie in depressions of the draw-head. When the cars come together, both latches rise on the incline and drop into both depressions, thus forming a double coupling. Uncoupling is performed by simply handling one lever. There is a lever at the top of each car and one at the side of each, which raise both latches at once by means of an eccentric.

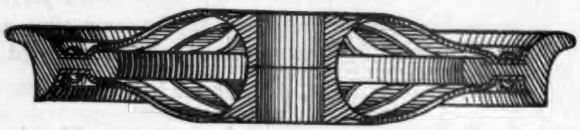
"THE very pink of perfection"—any one of the various styles of pens manufactured by the Esterbrook Steel Pen Co.

A YOUNG girl was caught kissing her sweetheart a few nights ago. Her mother took her to task for such actions, but the girl silenced her by this quotation: "Whatsoever ye would that men should do unto you, do ye even so unto them." The old lady wilted. Memories of old were brought forcibly to mind.

The Acme Steel Wheel.

ANY person who chooses to examine a freshly broken tire, rail or other piece of steel, used for analogous purposes, will be apt to find uncombined graphite, or a gas cell in the fracture. These faults can be remedied only by pressing the metal while still in a semi-molten state.

With a prompt acting press, which will gradually work up to a pressure of four hundred atmospheres before the metal gets cold enough to work in the dies of a hammer, the parts of the best wheel the world has ever known can be produced in the shape of ingots; when these parts are



hammered, they will fit each other with their skin undisturbed by lathe work to take the wear and tear of actual service.

The elasticity of the metal in all the parts, will be undisturbed until the wheel is in actual use. The tire will be inflexible and free from flaws. The web will be a perfect cushion. The weight need not exceed four hundred pounds.

Loaded with five tons, every spoke but the horizontal ones taking weight from the axle to the tire, the static strain on the metal of the web (¼ in. thick) will not exceed twelve hundred and fifty pounds per square inch of section. With these points it will aim to merit the position claimed for it.

The designer of the Acme Steel Wheel, E. B. Meatyard, C. E., Lake Geneva, Wisconsin, sends us a valuable account of the progress of his work, which we present in the confidence that it will be read with interest. He says:

"The essence of my deviation from the 'beaten line of rectitude,' lies in making the tire inflexible, absolutely circular, with its skin undisturbed by lathe-work, and perfectly balanced.

"After I got the shape, I found that I had to 'get into my hole and pull the hole in after me' to find a way to work Bessemer steel without wasting a large per cent. of the metal.

"I want pure metal with the desired per cent. of combined carbon, 'only this, and nothing more.' I have watched the tests and experiments from all sources, so far as they have been made public, for years, and can see no way to weld the walls of the blow-hole, and effect perfect homogeneity of the output but to give it every chance, chemically, under the maturing Bosic plan, omitting the introduction of silicon, and then pressing the ingots promptly while in the mold, and twice as hot as it is possible to get them in the hammer or roll.

"The Patent 283,631, is one of four different ways of making the 'Acme' Steel Wheel. Its specification shows the fallacy of trying to make its tire or nut of cast iron.

"The sheet metal for the disk must be from pressed ingots made solid by old-fashioned work, and not by the introduction of injurious agents.

"Unpressed steel castings have so much cinder and gas in them, that adequate hammering reduces their weight to a ruinous degree.

"Whereas, pure homogeneous castings weighing from 10 to 15 per cent. more per cubic foot, can be heated to a welding heat and hammered without serious loss of weight, for the reason that all the atoms of each mass have uniform and similar density.

"I do not know all of this by personal experience, but by careful comparison of published results.

"Exhaustive experiments have demonstrated that falsehood will travel 1,000 miles while truth is putting on its boots, and close observation shows that to the bilious critic,

"'Truth is a monster of such hideous mien,
As to be hated, needs but to be seen;
When seen too oft, familiar with its face,
They first endure, then pity, then embrace.'

"So I take comfort from getting along slowly in this matter, and from being the recipient of a large amount of unfair criticism."

Kasson's Lubricating Compound.

THIS celebrated compound, which is making rapid strides in public favor, is manufactured by the Kasson Bros., of the City of Buffalo, who are now turning out about one ton daily. The demand for the compound is increasing constantly, owing to the fact that grease as a lubricant is gradually taking the place of oil in many of our leading industries. It has been clearly demonstrated that where the grease compound has been used, there is a clear saving of 30 to 50 per cent. owing to the fact that there is neither drip nor gum to this Lubricant, whereas in oil there is always more or less drip or waste. The lasting qualities of the compound are two to one in its favor.

The writer has himself seen H. P. stationary engine, the eccentric and crank-pin of which have been lubricated with this compound for the past four months, and during this time has consumed 2 oz.; the engine has been used 10 hours per day, done heavy work, and run cooler than it ever did with the best lard oil. The chief engineer of the Union Steamboat Company, who have adopted this lubricant, says "that outside of the time and trouble it saves the engineer, it shows a clear saving of 75 per cent. over oil, making a total saving to the company of nearly fifteen hundred dollars a year.

The compound for railroad and tramway use differs somewhat from that used in machinery, being mixed with the best of white wool, and in that form takes the place of oil and waste, now used on railroads.

Wherever it has been tried it has shown a saving of 30 per cent. over anything ever used on railroads. It is well known that when a journal heats on a train, it necessitates a *stop*. The packing is pulled out and thrown away, and a new packing of oil and waste substituted in its place. Many accidents, sometimes called "unavoidable," are occasioned by the detention. It is also a dead loss to the railroad companies on account of the material wasted. When the compound is used, it never allows the journals

to heat sufficiently to necessitate the stoppage of a train. The heat test of the compound is 300 degrees, making it a safe agent against fire, and lessening the chances of damage to valuable machinery. It is now in use on a number of street steam railroads, and from present indications it is safe to say that it will soon be in general use as a railroad lubricant.

None but first-class material is used in the manufacture of the compound, each ingredient being a lubricator in itself. It is absolutely friction proof, and a want long felt is now supplied to the public. The price of the compound is such that it places it within reach of all needing a superior lubricant. It is put up in quantities to bring it in reach of all who need it, being in 25 and 50 pound packages, also in half-barrels and barrels. For further particulars address Kasson Bros., Manufacturers Kasson Lubricating Compound, Cor. Main and Perry Sts., Buffalo, N. Y.

THE LEARMONTH CAR-COUPLING.—It is claimed for this invention of James Learmonth, Corsicana, Texas, that it can be used without the necessity of doing away with the old-fashioned link and pin, its use being compatible with their continuance, by combining the new and the old system. The Learmonth coupling comprises the combination of two draw-heads, a spring-actuated jaw having a hole, and which acts as a support for the coupling-pin, with a spring-actuated jaw provided with a slot, and which has its outer end formed so as to act as a support for the link, both of the jaws having their outer ends to project beyond the mouths of the heads. Mr. Learmonth's patent is No. 282,910.

SAFETY RAILWAY SWITCH.—Sidings from main tracks are generally provided with a switch only at their junction with other tracks. A consequence of this is that heavily loaded cars often run down, by breaking of a brake, etc., upon the main track, or in reach of the express train on the main line, causing a collision. An invention by David H. Hoult, of Lansdale, Pennsylvania, United States patent No. 280,476, aims at the prevention of this danger; and to this end, provides the siding from a main line with a safety switch of peculiar construction, acting so as to cause cars on the sidings to run off either one or both rails of the track on to the cross-ties at some distance from the main line, whenever this is necessary in order to prevent a collision. Mr. Hoult's device, which is designed to work automatically, commends itself to full examination, by reason of its alleged importance in the saving of life and property.

MULTITUDINOUS new car-couplings include that of A. C. Long, Flora Dale, Pennsylvania, Patent No. 281,535, which couples by running the cars together, the links or hooks being always in position. It is also a self-uncoupler when the car leaves the track, but not otherwise. Ordinary uncoupling is effected by a lever which is operated in an instant. The coupling is so constructed as to couple by either end of the cars coming together. It is simple in construction.

SUBSCRIBE for the AMERICAN RAILROAD JOURNAL.

How to Get Rid of Smoke and Stop Waste of Fuel.

THE progress of invention pauses not; nothing now startles by its seeming impossibility. A hundred years ago the height of credulity was supposed to have been reached when an inventor proposed to light the streets of London with coal-smoke. Illuminating gas is now an old story. A proposition to burn water, or to run locomotives by the sun's heat would hardly be deemed impossible. The problem of our time, upon which a hundred ingenious minds are at work, is not so much the discovery of a new form of energy, as a greater economy in and control of the old ones. Steam is at once the most useful, powerful and manageable of the forces which have been yoked to the service of mankind. The steam engine has multiplied the power of man's hands, and even the delicacy of his manipulations. It is potent in the arts of war and in the arts of peace. To convert water into steam requires fuel in some form, and if the multiplication of engines goes on in the same progressive ratio it will become a question, where is the fuel to come from? Already, by a little calculation, we can predict with reasonable certainty when the coal beds of Western Europe will be worked out. All other kinds of fuel taken together are insufficient, even if they could be had, to keep down the advancing price of coal for steam purposes.

The problem is, how to save fuel; or, in other words, how to get more power out of the same quantity. There is an enormous loss and waste of fuel in all the methods in use in making steam. Science long ago determined the theoretical perfection of combustion, or, in the language of mechanics, the potential energy of a given weight of fuel. Combustion, as is well known, is simply the intermingling primarily of the two gases, carbon and oxygen; but how to get the carbon eliminated from coal or wood and so thoroughly intermixed with oxygen as to produce complete combustion whereby their volatile substance is consumed or oxidized is a discovery the world has long been waiting for. Some of the most important discoveries have been the simplest. After they had become familiar knowledge, one wonders that they had not been made long before.

Various plans have been suggested to get rid of the smoke nuisance. In the city of London, in Cincinnati, and in Chicago, municipal ordinances have been passed requiring consumers of coal in large quantities to attach some patented apparatus to their fires in order to consume the smoke. The inventions thus far applied have been cumbrous, expensive, and have had for their aim rather the diminishing of the visible smoke than its conversion into serviceable heat. The introduction of fan blasts to stationary engines, and more recently to locomotives, has increased the heat to be applied to the boilers and somewhat diminished the smoke; but with it have come two serious disadvantages: increase in the consumption of fuel, and a corresponding increase in sparks, or partially consumed coal. The loss of fuel thus driven out of the smoke stacks is enormous, to say nothing of the added cost of the devices to prevent further damage.

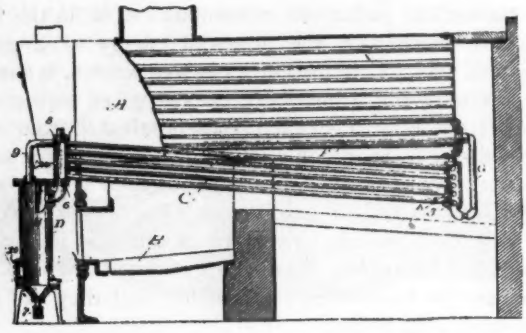
DR. GRAHAM, of Philadelphia, after studying the problem attentively from its chemical as well as the mechanical side, has hit upon a device which renders combustion complete within the fire-box, and thus avoids the double waste of smoke and sparks. The great merit and pecu-

liarity of this invention is that it proceeds upon scientific principles, the intermingling of an additional volume of oxygen with the liberated carbon, thus converting the whole value of the fuel into heat, and avoiding at the same time the smoke and spark nuisance. This discovery promises to be of the utmost importance, since it can be easily applied not only to locomotives but also to all kinds of stationary engines, stoves, and even to open grates; in fact, wherever either coal, coke, wood, charcoal, peat, petroleum or other fuel is used. It involves no complicated machinery, but can be applied to stoves and stationary engines at a trifling cost, and to locomotives for much less than is now spent in the various contrivances to arrest the outflow of sparks.

The results are experimentally shown upon oil-stoves and on heating stoves, but the principle employed is simple, automatic, and in conformity with the laws of gases. It is obvious at first sight, from the intense heat and blue flame that it is applicable to all forms of combustion. The saving of fuel alone is from 25 to 35 per cent.; and in bituminous coal it is claimed as much as 65 per cent. difference over the ordinary methods is found. The value of such a discovery need not be argued; it is self-evident.

Heater and Purifier for Feed Water.

THE conclusions arrived at by Walter McKinney, Binghamton, New York, after looking around to obtain a heater and purifier for feed water for his boiler, were: 1. That



it was important to raise the water above boiling point. 2. After raising it above that point, it must be provided that the water be at a state of rest, in order that any foreign matter might settle. 3. That a place should be provided where foreign matter might settle, if any should pass the mud drum. To obtain the desired result, the inventor of the Heater and Purifier under consideration places inside of the arch of a boiler, exposed to the hot gases of the fire, a coil or series of pipes, a series of pipes being preferable, as they can be arranged nearer the fire and take up less room if placed along one side. It is claimed that by this arrangement, if a sufficient amount of heating surface be allowed to the amount of water feeding a boiler, the water will be raised to a temperature of about 230 degrees Fah. The water being thus in a state where foreign matter would precipitate if it could be brought to a state of rest. To effect this a drum D, is placed outside, the reason for this position being so as to place it where no heat can form a current. The mud drum is upright, so that it has a sufficient depth of water. It has a deflector, so as to change and spread the current downwards, as it comes from the heater. To illustrate: take, for example, a pipe one and one-quarter inch in diameter, leading from the heater to the mud drum D, the drum D, being eight inches in diameter and three feet and a half deep. It will be seen that a current one and one-fourth inch in diameter, striking a deflector, placed just inside of an eight-inch receptacle three feet and a half deep, will have lost its velocity before rising to the top. At this point scale, etc., settles in the bottom of the drum, the hotter water rising to the pipe 9, and entering the boiler by the pipe or trough F. The object of trough F, is to catch any scale which may be carried past the mud drum, as it is well-known that where heaters are used the water very often coming in contact with a hotter mass precipitates its scale, and it lodges close to the mouth of the feed pipe, in frequent cases choking it up and preventing a sufficient quantity from entering the boiler. The pipe F, being larger and the entire length and open at the top, prevents any result of this kind. A circulating pipe G is provided to insure constant circulation when the pump or injector is not at work. Also a hand hole 10, and blow off 7, are provided for the purpose of cleaning and removing sediment. By means of the arrangement described, the inventor finds a greater economy of fuel and repairs, it keeping the boiler free from crust upon the fire sheets.

Mr. McKinney's invention has been patented.

A PATENTED invention by James L. Phillips, of Worcester, Massachusetts, relates particularly to steam valves and that class of valves known as "globe" valves, but may be applied to other similar kinds of valves. It consists in dispensing with the usual packing employed around the stem of a valve, and substituting in lieu thereof an automatic valve device, whereby the escapement of steam or similar products is prevented around said stem. All users of steam who have been troubled by the leakage of valves, will be interested in an invention promising so much. The inventor claims that by the use of his valve, described in the letters-patent as "Globe or similar Valve," enough steam to pay for it is saved in six months.

A FIRM in Paris has patented an invention for the instantaneous formation of steam, which permits of its use at once in the cylinder of the engine. A pump sends the required quantity of liquid between two plate surfaces, which are heated, and between which there is only a capillary space. The liquid spreading in a thin layer evaporates at once, without going into the so-called spheroidal state, and this steam acts in the cylinder as fresh formed steam. The speed of the pump is regulated by the engine, the pump being connected with the shaft of the engine.

SEVERAL attempts have been made to extend the smoke stacks of locomotives over the tops of the cars by means of pipes, making the point of emission the back end of the train. Could this be carried out, it would effectually cure the nuisances of smoke and cinders. But the thing has been found impracticable, for the numerous joints could not be kept together with a train jostling round curves at high speed. An inventor, all the way from Constantinople, Turkey, has now taken out a patent for a device of this kind.

Panabaker's Excelsior Car-Coupling.

THIS invention relates to that class of car-couplings which are coupled automatically by the coming together of the cars. The draw-head or buffer is attached to the car-frame in the same way as the buffers now in common use on freight cars. The buffer is divided into two compartments, the upper one of which contains a part of the new coupling, while the top and bottom of the lower compartment have vertical perforations to receive a coupling-pin, when it is desired to use the ordinary link and pin coupling. The top, bottom and sides of the upper compartment of the buffer are provided near the front ends with grooves, to receive the front ends of the guard-plates, four in number, which are coiled at the front and rear ends, forming tubes. The front tubes of all the guard-plates fit into the grooves of the buffer and receive pins. Thus the plates are hinged in their respective places. The coils or tubes at the inner ends of the plates are in the form of bevels to insure the smooth operation of the device. The upper compartment of the buffer is also provided with guide-plates secured to the inner side, top and bottom of the same, so as to guide the link in an inward or rearward direction. Between the front ends of these guide-plates, and the walls of the buffer are clamped flat springs, which bear against the inner ends of the guard-plates, and hold them closely together; without, however, interfering with their free movement on their hinges. A longitudinally sliding follower is placed just back of the said guide-plates, which a spring forces in a forward direction against the rear ends of the guard-plates, The rear end of the follower is provided with a slot to receive the end of a lever, pivoted so as to swing horizontally under the car-frame, and work in a slot in the side of the buffer. The coupling-pin slides in a tubular casing secured to the side of the buffer, and passes from the side through the buffer; and a coil-spring is placed in the tubular casing to force the coupling-pin in an inward direction. A vertical shaft is fastened to the end of the car at suitable bearings. It has a hand-wheel at the top by which it may be manipulated. The lower end of the shaft has a grooved wheel, to which is attached a chain from the coupling-pin. The under side of this wheel has a lever to be used when the operator is on the ground. A pawl is pivoted under the car-frame, the outer end of which rests against and is held in contact with the rear side of the grooved wheel by a spring. This wheel has a notch to receive said pawl.

The ordinary link, when turned on edge, may be used in connection with the Panabaker buffer. For coupling to cars having the ordinary buffer a double link should be used; for coupling cars of different heights, a link consisting of a central plate to which the semi-links are secured one above the other and on opposite sides of the central plate. The cars are uncoupled by turning the shaft either from the top of the car or from the ground, until the pawl is forced into the notch in the grooved wheel. Thus the coupling-pin is drawn out and held.

The cars are automatically coupled as follows: The link enters the buffer, passes in a rearward direction between guard-plates and guide-plates, until it reaches the follower, which it forces back. Thus the lever is forced against the inner end of the pawl, which is forced out of the notch in grooved wheel. Then the coupling-pin is forced in by the spring in the tubular casing, and the coupling made without danger to life and limb. Coupling may be withheld by setting a pawl in ratchet-wheel, if necessary.

Parties desiring further information in regard to this coupling can address P. F. Panabaker, Coon Rapids, Iowa.

Water as a Lubricator for Hot Journals on Railroad Cars.

WITH the best of oil, brasses and journals, much to the chagrin of M. C. B's and M. M's there will come hot boxes. True there is not one to-day where there were ten fifteen years ago, owing to improvements in car construction, adapting the bearings to the load, etc. But it is equally true that no railroad company but that does have trouble with hot boxes, and the older roads have "their tracks full of trains," and the increase of speed and weight of cars and loads is making the risk and trouble a serious matter. The demand for faster passenger travel, and a growing demand for faster time on stock and time freight, brings out the importance of any practical relief from hot boxes.

The idea of this invention is to supply a simple, sure, safe and practical cooler and lubricator for journals, after they get so hot and rough as to be beyond control of the train-men. It has been found that a stream of water as large as a tooth-pick, thrown against the end of a journal, or out of a pipe having a 1-16 inch discharge, the train being *set in motion*, a journal will run down cold in from twenty to forty minutes, no matter how hot or rough.

It has been *tried* on *every* bearing from engine truck to caboose, and barring some defects in the fastening to oil box, has worked satisfactorily in every case. A fastening is now made that will hold securely to any style of oil box.

The Ohio and Mississippi Railroad have been experimenting with it on some of their trains, and April 20, 1883, Capt. Peabody gave the following:

"To whom it may concern:

"We have *thoroughly tested* the Morris system of Lubricating hot journals on railroad cars, and I am satisfied it is a *good thing*, and have decided to adopt it.

(Signed) W. W. PEABODY, General Superintendent."

The device as first made and used is specially adapted to freight or mixed trains. A recent improvement consists of a tank either in the floor timbers of the car, under a car seat, or in any part of a car, with pipes leading to each box, all arranged so that if a journal begins to get hot on a long run or between stations, the water may be turned on while the train is in motion, and thus stop the heat and cutting before it gets to a danger point, or so as to injure the brass or journal.

The older device consists of a canvas bag, water-proof, and an eye bolt to screw into the floor timbers of a coach or siding of a freight car, upon which the bag is suspended. A clamp fastens the end of the pipe or ½ inch rubber hose to the oil box, all so arranged as to throw the water just where wanted. One bag of water (about six gallons) will cool *any* journal but not always smooth it—making the refilling a necessity. It is also found that a journal, however rough when water is applied, will have a very high polish when smoothed with water.

No change of any kind is required to use the bag on any car. Any railroad man who would like to look into the matter, and will send his address with a request for a bag

for trial, will receive one complete and ready for use. To any railroad company that will equip from one to ten cars with the later improvement, will be granted the right to do so free of royalty charges. It has *repeatedly* been demonstrated that cars so heavily loaded that *no* kind of *dope* or *oil* would keep the journals *cool*, have been lubricated with *nothing but water*, and run *cold* and *smooth*, as long as water was used, and when repacked with oil they would get hot. Many times has this been done, and will be again for any railroad company that desires to see it. Parties interested can address the inventor, R. C. Morris, Olney, Ill.

The Ball Engine and Governor.

THE principle of the Ball Engine and Governor is that the resistance of the load is used as one of the governing forces. It has been widely discussed and generally approved. We give herewith three cuts illustrating the engine and governor and its peculiarities. The description is adapted from an able article in *Mechanics*.

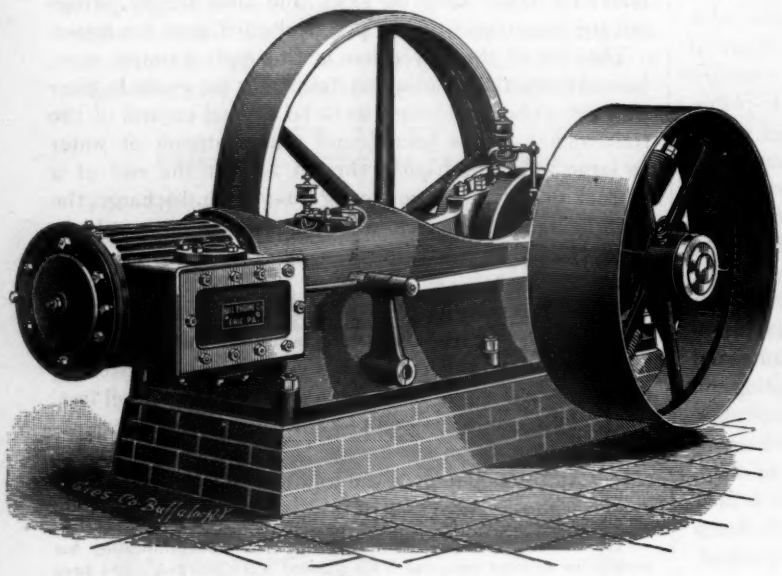


FIG. 1.—THE BALL ENGINE AND GOVERNOR.

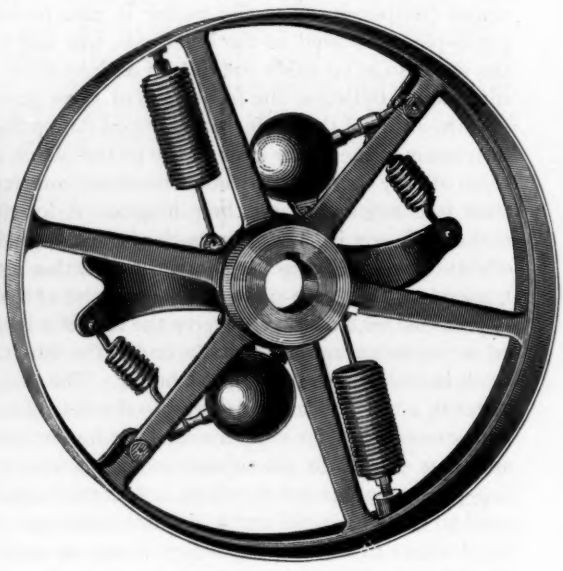


FIG. 2.—GOVERNOR WITH THE ECCENTRIC DETATCHED.

The reader will observe in Fig. 1 that the form for the frame is exceedingly rigid. The frame is bored longitudinally to reeeive the guides, which are of the locomotive type and are fitted into the bore of the frame, thus securing perfect alignment. The cranks are of the disk pattern and counterbalanced, the wearing surfaces unusually ample, and the engine throughout constructed in a very solid manner, in order to adapt it to high speeds, heavy duty, or both. The ability of the governor to maintain an absolutely uniform speed of rotation under the widest variation of load seems to justify the claim that as an electric-light engine it will stand very high. The very wide scope of the goveror action deserves especial attention in connection with electric lighting. The governor is capable of increasing the speed as the load increases, and of falling off as the load diminishes. Such a regulation as this when separate engines are used for each dynamo is very valuable. When so arranged the engine runs up to standard speed only when the full number of lights are in use, and as lights are turned out the engine slows down instead of accelerating its speed, as is commonly the case. The advantage of being able to do this are too apparent to need enumerating. This result, we believe, has never before been attempted. With all the forms of steam-engine governor heretofore known, a slight falling off of speed as load is added cannot, in the nature of things, be avoided, and to reduce this to a minimum has been the aim of engine builders. The introduction of the load itself as a factor in controlling the speed makes it possible either to obtain a perfect uniformity or to obtain an acceleration under an increasing load.

Fig. 2 shows the governor, pulley, balls, springs, arms, etc., but with the eccentrics detached. These, however, are shown in Fig. 3. The construction is considerably changed from the original design. In Fig. 2 the driving pulley is mounted on the hub of a fixed arm, and covers the weights and springs. The centrifugal force of the weights is opposed by the larger springs, and the connection with the end of the fixed arm makes the effort of the engine also oppose the centrifugal force, It will be seen from this that the position of the weights at any given speed is the result of the combined force of the large springs and the effort of the engine. In this way the governor is adjusted to constantly weigh the work being done, and when the large springs hold the weights in position to give the required speed to the empty engine, the resistance of the load draws them in just the necessary distance to maintain the speed desired. Fig. 3 shows the eccentric and the mechanism which connect the governor weights to the eccentric. A is the connect and B an arm attached to its side, the outer end of which is pivoted to the fixed arm of the governor, thus allowing a swinging motion of the eccentric equal to the length of the elongated shaft opening in eccentric. C is a disk having a flange D, eccentric to the shaft. E is a ring fitted inside this flange and carrying the stud F, which stud engages the eccentric A. It will be seen that the rotating of disk C causes the swinging or "pendulum" motion of eccentric A, by which governing is effected. G is a flanged collar

screwed to a sleeve projecting from the disk C. Its office is to hold eccentric in contact with disk C. The rotating of this disk is caused by links connecting it with the governor weights. The peculiar manner of controlling the

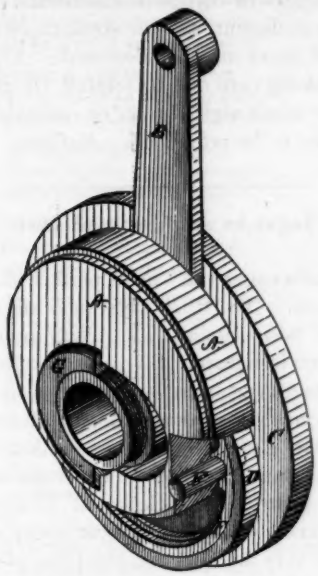


FIG. 3.—THE ECCENTRIC.

eccentric with another eccentric enables the governor to drive successfully an unbalanced valve, which is a very desirable feature.

We may add to this description that the Ball Engine Company, Erie, Pennsylvania, have published an illustrated circular and price list, giving much useful information about their cut-off engine, "embodying a new system, in which the governor weights the load."

A FIRELESS LOCOMOTIVE, the invention of Mr. Honigmann, is creating considerable interest on the continent of Europe. When its boiler has been charged the engine is ready for use, and works like any ordinary engine; but after the steam has performed its ordinary duty in the cylinder, it supplies, by becoming condensed, the heat which produces a fresh portion of steam, and the more quickly the piston works the more force will be liberated. The engine thus appears to be its own source of power. The limit of action, from want of coal in the ordinary case, here sets in with want of strong caustic soda, which by the continuous absorption of steam finally becomes too diluted. When the engine has thus exhausted itself, both the water and the soda solution have to be drawn off, the soda to be concentrated again by evaporation, the boiler to be refilled with water of the required temperature.

"WHAT a wonderful age of invention it is," said Mrs. Peterson; "I see they are now making wire cloth, and I'll have some this very week to put a seat in Johnny's every-day pants."

RAILROAD FOR CAPE BRETON.—A local paper reports a large and enthusiastic meeting held in Sydney, lately, to consider the question of securing railway facilities for the island of Cape Breton. A number of stirring speeches were made, in which the opinion was expressed that the commercial and mining interests of the island demand imperatively that a railway be built at the earliest possible moment. United action was strongly urged, and a determination expressed to permit neither party feelings nor local jealousies to stand in the way of accomplishing the desired object. It was unanimously resolved to address petitions to both the local and the Dominion governments on the subject, and to circulate them throughout the four counties of the island, asking the people to sign them as largely as possible. Committees were appointed to carry out the resolutions.

ON THE PENNSYLVANIA RAILROAD.—In summer and autumn the east-going track of this line (the Pennsylvania Railroad) is covered with a low green growth, while the west-going track shows only the cracked stone of the "ballast." The reason of this is that trains from the West drop stray grains of wheat all along, which spring up among the stones. Birds from the neighboring woods make this granary a feeding ground, and even wild turkeys have been seen there snatching a hasty meal between two trains. Could there be a prettier piece of unconscious poetry than this in the midst of prosaic trafficking? Some of the poorer dwellers along the route emulate the birds by collecting coal that drops from the freight cars like the grain, and many get their whole fuel supply from these crumbs of the rich man's table. Sitting on the cool verandas of the Mountain House at Cresson, of a July dusk, the tourist or the resting man of business sees a line of a hundred cars, with the tawny flare of locomotive fires at either end, carrying toward the sea the food of nations; or hears, perhaps, like the sound of a population on the march, the low, heavy rumble of wheels that are bearing immigrants to their still uncreated homes. He listens, in fine, to one of the pulse-beats of the world.—*Harper's.*

PETROLEUM wells exist in India which are said to have been flowing for thousands of years. Doubtless the business of gathering the oil to serve some simple uses in its crude state is as old as civilization. Talking one day about the first discoveries of oil with a "wild-catter," on one of the narrow-gauge railway lines, that run over the mountains and through the forests to reach the wells of Warren and McKean counties, the man said: "Why, the oil business is no new thing. It's as old as the scriptures. Job was an oil man. He struck the rock, and it poured forth rivers of oil. He got rich in the oil business." "Yes," chimed in a stranger on the other side of the car, 'and that's the way he got his boils. I know men who can't be about oil wells without getting boils. They breathe in the carbon, and it goes into their blood." The "wild-catter" agreed with this theory, and added "that he had no doubt Job's wells took fire, burned up his children, and reduced him to poverty."—*The Century Magazine.*

THE WESTINGHOUSE BRAKE.—An English exchange notices a recent remarkable proof of the value of the Westinghouse brake. It says: "We may mention an incident which occurred recently, where the quick action of the Westinghouse brake certainly saved a serious collision

at New Cross, on the London, Brighton, and South Coast Railway. The signalman having allowed a light engine to pass his cabin, forgot that it was still standing on the main line, and lowered the signals for a heavy excursion train which was approaching. A curve in the line prevented the driver seeing the obstruction, but fortunately the yard foreman observing the danger, rushed towards the advancing train, and attracted the driver's attention. The latter at once applied the Westinghouse brake, and the train conveying nearly five hundred passengers was brought to a stand within three yards of the buffers of the light engine."

THE FASTEST RAILWAY TRAIN.—The fastest train in the world is the "Flying Dutchman" in England, which carries the mail 118 miles in two hours, or 59⅛ miles per hour. Germany comes second with a train running 51 7-10 miles per hour. In America the Canada-Atlantic takes the lead with a train making fifty miles per hour. Allowing but two minutes for each stop on the Canada-Atlantic, the rate of speed on its fast train would be surpassed by but one train in the world, the Flying Dutchman. The fastest train in the United States is on the Pennsylvania Railroad, and runs from Jersey City to Philadelphia—90 miles—in one hour and 52 minutes, the average speed being 48 3-10 miles per hour. The Boston and Providence run the fastest train in New England—44 7-10 miles per hour.

A WORD of caution is necessary about the ink pencils which have come so much into vogue lately. A most useful implement to the business man, this innocent looking pencil can be easily converted into a treacherous friend, and on no consideration should be used to write signatures. The composition of the pencil is a peculiar combination, highly poisonous in itself—and herein lies the danger to signature writers—competent to give off two or more impressions on damped paper—not tissue paper, be it understood, but ordinary writing paper. Attention was first directed to the peculiarity by an official of the Bank of New Zealand, and experiments proved the easy practicability of making a clear copy of the filling in of a cheque with this ink pencil. First the writing of the cheque is transferred, upside down, of course, to a slip of damped paper, and from that transferred, right side up, to another slip of damped paper. We tested this recently in the case of a cheque written with the ink pencil, and sent in from the country, and by simple hand pressure obtained a very perfect copy of the transferable parts of the document,—*Paper and Printing Trades Journal.*

TO CLEAN BRASS AND COPPER.—Somebody says large articles of brass and copper which have become very much soiled may be cleaned by a mixture of rotten-stone (or any sharp polishing powder) with a strong solution of oxalic acid. After being thoroughly cleaned, the metal should be wiped off with a cloth moistened with soda or potash, and a very light coating of oil should be applied to prevent the further corroding action of the acid. A more powerful cleaning agent, because very corrosive, is finely powdered bichromate of potash mixed with twice its bulk of strong sulphuric acid, diluted (after standing an hour or so) with an equal bulk of water. This will instantly clean the dirtiest brass, but great care must be taken in handling the liquid, as it is very corrosive. Brass which has been lacquered should never be cleaned with polishing powders or corrosive chemicals. Wiping with a soft cloth is sufficient, and in some cases washing with weak soap and water may be admissible. Dry the articles thoroughly, taking care not to scratch them, and if after this they show much sign of wear or corrosion, send them to the lacquerer to be refinished.—*Building.*

Sugar as an Article of Diet.

DUTROME calls sugar the "most perfect alimentary substance in Nature." Dr. Rush says sugar affords the greatest quantity of nourishment in a given quantity of matter of any substance in nature. Sir John Pringle tells us that the plague has never been known to visit any country where sugar composed a material part of the diet of the inhabitants. Dr. Cullen is of the opinion that the frequency of malignant fevers of all kinds has been lessened by the use of sugar. The celebrated Trouchina recommended sweetened water for almost every malady. Dr. Frothergill was very anxious that the price of sugar should be so far reduced as to make it accessible to the common people. Dr. Franklin had taken large quantities of blackberry jam for relief from pain of the stone, but discovered at length that the sanitary property resided wholly in the sugar. Sugar has been found to be an antidote to the poison of verdigris, if taken speedily and in abundance. It has been said that sugar injures the teeth, but this opinion does not deserve a serious reflection. The plentiful use of sugar is one of the best preventives of intestinal diseases in children. Nature seems to have implanted a love for this aliment in young people, as if it were on purpose to defend them from such disorders.

Absorbing the National Wealth.

A SYNDICATE of European and American capitalists, in which is Lord Rosebury, is said to be buying up the coal lands in the Connellsville coke regions, so as to control the manufacture. Coke is of growing importance in the smelting of iron as well as the more precious metals, and something of its value may be guessed by the shipment of coke from these fields east of Pittsburgh as far west as Salt Lake, and by sea to Arizona and Idaho. There is some coking coal found in southern Colorado. The next most important deposit is in West Virginia along and near the Chesapeake and Ohio Railroad, and in Eastern Kentucky, so that it will be some time before all the coke falls into the hands of one set of men.

At the same time we hear of syndicates in anthracite coal lands, syndicates in oil lands, syndicates in pine timber lands, syndicates in grazing lands, syndicates in quicksilver, nickel, and in whiskey, native wines and wheat, in which more or less foreign capital takes part. We are on the eve of some mammoth speculations in this country, the like of which have never been seen in the world before.

ADVERTISE in the AMERICAN RAILROAD JOURNAL.

Maidenhood.

Maiden! with the meek, brown eyes,
In whose orbs a shadow lies,
Like the dust in evening skies!

Thou whose locks outshine the sun,
Golden tresses wreathed in one,
As the braided streamlets run!

Standing, with reluctant feet,
Where the brook and river meet,
Womanhood and childhood fleet!

Gazing, with a timid glance,
On the brooklet's swift advance,
On the river's broad expanse!

Deep and still that gliding stream
Beautiful to thee must seem
As the river of a dream.

Then why pause with indecision,
When bright angels in thy vision,
Beckon thee to fields Elysian?

Seest thou shadows sailing by,
As the dove, with startled eye,
Sees the falcon's shadow fly?

Hear'st thou voices on the shore
That our ears perceive no more,
Deafened by the cataract's roar?

O thou child of many prayers!
Life hath quicksands—life hath snares;
Care and age come unawares!

Like the swell of some sweet tune,
Morning rises into noon,
May glides onward into June!

Childhood is the bough where slumbered
Bird and blossoms many numbered;—
Age, that bough with snows encumbered.

Gather then each flower that grows,
When the young heart overflows,
To embalm that tent of snows.

Bear a lily in thy hand;
Gates of brass cannot withstand
One touch of that magic wand.

Bear, through sorrow, wrong and ruth,
In thy heart the dew of youth,
On thy lips the smile of truth.

O that dew like balm shall steal
Into wounds that cannot heal,
E'en as sleep our eyes doth seal.

And that smile, like sunshine, dart
Into many a sunless heart,
For a smile of God thou art.

HENRY W. LONGFELLOW.

Air and Exercise.

SOME DIRECTIONS GONDUCIVE TO GOOD HEALTH AND LONGEVITY.

THE summer air of the highlands makes out-door life a luxury, but the chief advantage of the plan is this: The stimulus of a pleasant pastime enables a man to beguile himself into about ten times as much exercise as he could stand in the Turner hall. The visitors of a hygienic gymnasium take their turn at the horizontal bar as they would swallow the drug of a public dispensary; they know that it is a lesser evil, they know that the road to Styx is the alternative, they intend to come every day, but the intolerable tedium of the crank-work exercise soon shakes that resolution. The motive for exertion is too abstract; it lacks the charm of progressiveness and the stimulus of a proximate, tangible and visible purpose. The sham competition of a regiment of invalids under the command of a turn-master does not much sweeten the bitter broth; it is still crank-work, minus the club of the jailer, and nine out of ten hygienic gymnasts will soon find or make a pretext for discontinuing their visits. How many out of a hundred pupils of a young ladies' seminary would dream of performing their "calisthenics" at home! They would as soon walk on all-fours, or ride on a dry clothes-line. But arrange a May-day picnic in the mountains, and they will beat a kid in climbing the steepest rocks, and swing on wild grape-vines for hours together.

It is likewise certain that fatigue can be far better borne if the body is not encumbered with a surplus of calorific clothes. A pair of linen trousers, a flannel hunting shirt and a loose necktie make the most hygienic summer dress. In the afternoon remove the necktie and roll up the shirt sleeves; it can do no harm to imbibe fresh air by all available means, and let the cutaneous lungs share in the luxury. Nor is there any excuse for the widespread fallacy that it is dangerous, even in the most sweltering nights, to remove the bed blankets. Kick them into the farthest corner if they become too warm, and sleep in your shirt and drawers, or under a linen bed sheet. Half-naked lazzaroni sleep the year round on the stone terrace of the Museo Borbonico and outlive the asthmatic burghers in their sweat-box dormitories. The body effects part of its breathing through the pores. Painting a man with yellow ochre and copal varnish would kill him as surely as hanging him by the neck. The confined air between the skin of the body and a stratum of heavy blankets gets gradually surcharged with carbonic acid—in warm weather even to the verge of the saturation point. The perspiration is thus forced back upon the body; and the lungs—perhaps already weakened by disease—have to do double work.—*Popular Science Monthly.*

Tar, Rosin and Turpentine.

ALL of the substances named above are obtained from the more resinous trees of the pine family. Tar, the first named, for example, is obtained by distilling in rude apparatus the heart-wood of the pine. It forms a brownish-red substance, which becomes black with age, or when overheated in the process of manufacture. It is viscous and semi-fluid at ordinary temperature, solid when cold, and becomes quite a thin fluid when heated. Pitch is obtained by boiling tar until its consistency has become considerably increased, in which condition it is hard at ordinary temperatures, but becomes soft by the heat of the hand, and liquid on heating. Turpentine is the sap of the pine, which is obtained by tapping the trees at certain seasons when it flows most freely. The product yielded from the trees tapped for the first time is much whiter than that afterwards obtained, and is called white turpentine, or "virgin dip." The flow obtained after this for a succession of years is called "yellow dip." Trees stand this tapping for twelve or fifteen years in succession. By distilling this turpentine, or "gum turpentine," as it is properly called, with water, it yields two products, spirits of turpentine (which distils over with the water) and rosin, which remains behind in the still, and is afterwards run off and collected separately. The "virgin dip" yields a larger proportion of spirits of turpentine—about six gallons to

the barrel—than the "yellow dip," which yields about four gallons to the barrel. The "virgin dip" is therefore the more valuable of the two, both because it yields a higher percentage of the valuable spirits of turpentine on distillation, and because the resulting rosin is lighter in color. These industries are chiefly carried on in North Carolina, United States.

Hotels in India.

HOTELS in India are worth noticing. The first with which I made acquaintance was at Vixgapatam, kept by one Baboo Krishna Ghosal Bhat. Something like a Pompeian house, composed of pillars, half-roofs, peristyles, atrium, etc., furnished with punkahs and kus-kus tatties (that is, mats made of fragrant fibre, hung against open windows and doors; in the hot winds they are wetted, and the draught blows through them cool and refreshing). There was no furniture to speak of, save two lame tables, three bottomless chairs, and plenty of dirty whitewash and cobwebs, relieved by some colored German prints, such as are purchasable at the Nuremburg fairs for a few kreuzers apiece. "Pegs"—that is, brandy and soda water—were procurable and drinkable; but eating was out of the question, everything was so abominably filthy. I was rescued from starvation by a friend who lived some three miles distant—at Waltair—or I should have perished from hunger or nausea. In traveling up country in India, people always take their servants to cook for them, unless they can depend upon the hospitality of a friend. They also take bedding with them, which is arranged on a horizontal harp, supported by four legs, called a "charpoy." This last precaution is very necessary, as a charpoy *au naturel*, as used by the natives, would not be considered comfortable by Europeans, who prefer mattresses to knotted cords, which, to say the least, are calculated to impress a pattern on the flesh of whoever reposes thereon. The worst feature of Indian hotels, however, is that of the inner-man administration. It is impossible to give an idea of the monotony of the bills of fare. Every dish, whether boiled fish or roast joint, omelette or curry, chop or vegetable, tasted of and was pregnated with *ghee*, which is about the most disagreeable description of grease with which I am acquainted. It is worse than the bad oil in Wallachi. It would be vain for me to attempt to describe the distaste with which I approached the table, or the disgust with which I left.

Variations in the Use of Words.

IT will hardly be denied in any quarter that the speech of the United States is quite unlike that of Great Britain in the important particular that here we have no dialects. Trifling variations in pronunciation, and in the use of a few particular words, certainly exist. The Yankee "expects" or "calculates" while the Virginian "reckons;" the illiterate Northerner "claims," and the Southerner of similar class, by a very curious reversal of the blunder, "allows" what better educated people merely assert. The pails and pans of the world at large become "buckets" when taken to Kentucky. It is "evening" in Richmond while afternoon still lingers a hundred miles due north at Washington. Vessels go into "docks" on their arrival at Philadelphia, but into "slips" at Mobile; they are tied up to "wharves" at Boston, but to "piers" at Chicago. Distances are measured by "squares" in Baltimore, by "blocks" in Providence. The "shilling" of New York is the "levy" of Pennsylvania, the "bit" of San Francisco, the "ninepence" of old New England, and the "escalan" of New Orleans. But put all these variations together, with such others as more careful examination might reveal, and how far short they fall of representing anything like the real dialectic differences of speech that obtain, and always have obtained, not only between the three Kingdoms but even between the contiguous counties of England itself. It ought to be remembered also that the ordinary langnage of the United States includes not greatly more of what may be called caste variations, than of those that are attributable to differences of locality. The speech of the lower orders of the people, whether examined in regard to its vocabulary, its construction, or its pronunciation, differs from what all admit to be the standard correctness by a much smaller degree than is the case in England. A comparison of slang dictionaries will reveal a far longer list of unauthorized words as current among British "codgers" than among their congeners in the United States. Grammatical rules are violated badly enough by the ignorant of our own cities every day, no doubt; but how often, after all, will you hear from intelligent and respectable working people of American descent quite such a solecism as the "I were" and "he were" that one so frequently notices in the mouths of lower middle-class Britons, accustomed all their lives to conversation with speakers of the purest English? And as for the pronunciation, we have our faults, of course, in abundance; but where, from the Atlantic to the Pacific, will you discover any such utter disability of hearing or discernment as can permit men to drop or multiply their h's, or transpose their w's and y's. —*Prof. Tucker in North American Review.*

Eat Honey.

WHY CHILDREN SHOULD BE FED ON NATURE'S SWEET.

THOUSANDS and tens of thousands of children are dying all around us, who, because their ever-developing nature demands sweetness, crave and eagerly demolish the adulterated "candies" and "syrups" of modern times. If these could be fed on honey, instead they would develop and grow up into healthy men and women.

Children would rather eat bread and honey than bread and butter; one pound of honey will reach as far as two pounds of butter, and has, besides, the advantage that it is far more healthy and pleasant-tasted, and always remains good, while butter soon becomes rancid, and often produces cramp in the stomach, eructations, sourness, vomiting and diarrhea. Pure honey should always be freely used in every family. Honey eaten upon wheat bread is very beneficial to health.

The use of honey instead of sugar for almost every kind of cooking is as pleasant for the palate as it is healthy for the stomach. In preparing blackberry, raspberry, or strawberry short-cake, it is infinitely superior.

It is a common expression that honey is a luxury, having nothing to do with the life-giving principle. This is an error—honey is food in one of its most concentrated forms. True, it does not add so much to the growth of

muscle as does beef-steak, but it does impart other properties, no less necessary to health and vigorous physical and intellectual action. It gives warmth to the system, arouses nervous energy, and gives vigor to all the vital functions. To the laborer, it gives strength—to the business man, mental force. Its effects are not like ordinary stimulants, such as spirits, etc., but it produces a healthy action, the results of which are pleasing and permanent—a sweet disposition and a bright intellect.

How Tacks are Made.

THE iron is received from the rolling mills in sheets from three inches to twelve inches wide, and from three feet to nine feet in length, the thickness varying, according to the kind of work into which it is to be made, from one-eighth to one thirty-second of an inch. These sheets are all cut in about thirty-inch pieces, and by immersion in acid cleaned of the hard outside flinty scale. They are then chopped into strips of a width corresponding to the length of the nail or tack required. Supposing the tack to be cut is an eight-ounce carpet tack, the strip of iron, as chopped and ready for the machine, would be about eleven-sixteenths of an inch wide, and thirty inches long. This piece is placed firmly in the feeding apparatus, and by this arrangement carried between the knives of the machine. At each revolution of the balance wheel the knives cut off a small piece from the end of this plate. The piece cut off is pointed at one end, and square for forming the head at the other. It is then carried between two dies by the action of the knives, and these dies, coming together, form the body of the tack under the head. Enough of the iron projects beyond the face of the dies to form the head, and while held firmly by them a lever strikes this projecting piece into a round head. This, as we have said before, is all done during one revolution of the wheel, and the knives, as soon as the tack drops from the machine, are ready to cut off another piece. These machines are run at the rate of about 250 revolutions per minute. The shoe-nail machines, for cutting headless shoe-nails, are run at about 500 revolutions per minute, and cut from three to five nails at each revolution.—*Mechanical Engineer.*

The Value of Coal Tar.

IT is not longer than thirty years back, that coal tar was almost entirely valueless. In London it was sold at a half-penny per gallon, and that was considered a very good price for a product which, in most of the towns of England, was given away by the manufacturers of lighting gas for nothing, only to get rid of the "nuisance and incumbrance." Up to 1856 only small quantities of benzine, naphtha and creosote oils were distilled from it. In that year, the discovery of Perkin's aniline violet attracted the attention of the industrial and commercial world, and coal tar entered the list of regular articles of commerce; the demand for it increased rapidly, and with it the price rose proportionally. At present the color industry consumes the entire production of benzine, the greatest portion of the naphtha, all the anthracite and a part of the naphthaline which are produced from coal tar.

The value of coloring material annually produced in England alone, from coal tar, is estimated at 3,200,000 lb. Besides, there are produced over 1,000,000 tons of ammonia and 95,000 tons of sulphate of ammonia, worth more than £20 per ton. The value of these side-issues of the English gas-works is said to far exceed the value of the coal consumed by them, and which is estimated at 3,000,000 lb. annually. This profitable utilization of the waste-products is the reason why gas is so cheap. The so-called gas-works in England occupy themselves, in fact, mainly with the manufacture of coal tar, ammonia, etc., and therefore furnish the gas, as an incidental product, at a price only a little above the cost of making it.

The Cigar as a Social Force.

MAKE no mistake, a cigar is a great arbitrator. It helps break the ice, it bridges over the gulf of embarrassment in meeting unexpected or undesirable parties, it is a sort of passport to good-fellowship and kind treatment. It tides over that awkward first few minutes when you sit down to a business confab with strangers, or men that you are a little shy of; and it fills in the odd moments when you are waiting to see which way the cat will jump. By the attention which you must give your cigar you gain time for deliberation, and it somehow gives you an appearance of fortitude and composure which you don't feel in the least. Why, let two men light cigars and sit down to make a contract, and I'll guarantee they'll get five per cent. better terms on each side than if they nervously whistled and drummed on the table between spells.

So, in a business way, I think it is often an advantage to smoke. If I were a newspaper man I should learn that and short-hand the first thing.—*Lafayette (Ind.) Times.*

ONE of the severest losses inflicted by the burning of the exposition building at Pittsburgh on the morning of the 3d inst., was the destruction of the famous old locomotive exhibited by the Baltimore and Ohio railroad company at the recent national exposition of railway appliances, and known as the Arabian.

The Lake Shore and Michigan Southern Railway Co.

TREASURER'S OFFICE, GRAND CENTRAL DEPOT,
NEW-YORK, Sept. 26, 1883.

The Board of Directors of this Company have this day declared a QUARTERLY DIVIDEND of TWO PER CENT. upon its capital stock, payable on THURSDAY, the first day of NOVEMBER next, at this office.

The TRANSFER BOOKS will be closed at 3 o'clock P. M. on TUESDAY, the 2d day of OCTOBER next, and will be reopened on the morning of MONDAY, the 5th day of NOVEMBER next.

F. W. VANDERBILT, Acting Treasurer.

Johnson Steel Street Rail Co.

JOHNSTOWN, PA.

Johnson's Patent Girder Rail.

WE FURNISH ALL APPENDAGES:

Rails, Curves, Crossings, Track Bolts, Frog Plates, Switches, Turn-table Guides, Joint Plates.

Descriptive Pamphlets and Circulars furnished if desired.

TRADE VALENTINES VARNISHES MARK.

THE STANDARD FOR QUALITY.

September, 1883.

GOLD MEDAL

AWARDED BY THE

AMSTERDAM INTERNATIONAL EXHIBITION

TO

Valentine's Varnishes.

VALENTINE & COMPANY,

NEW YORK,

245 BROADWAY.

BRANCHES:

Chicago. Boston. Paris.

HAMMIL & GILLESPIE,

IMPORTERS OF

Dry Colors, Clays, Bath Bricks, etc.

DEALERS IN

Polishing Powders, Fire Bricks, Cements, etc.

240 and 242 Front Street, NEW-YORK.

Derby Roll-Top Office Desks.

Write for Descriptive Price List.

It will pay you.

These Desks are celebrated for their perfection of workmanship, finish and wearing qualities. They have over 350 first-class references in N. Y. City alone.

JOHN M. TUFTS, Jr., Sole Agent,

83 Nassau St., N. Y. City.

WHITALL, TATUM & CO.,

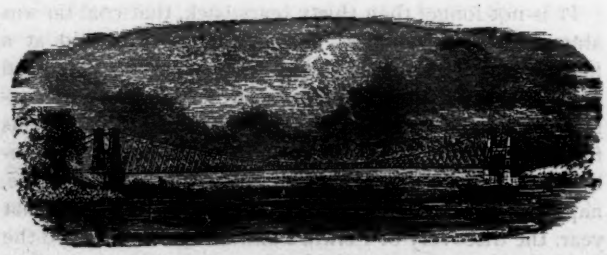
New-York, MANUFACTURERS OF Philadelphia,

CHEMICAL

AND OTHER

GLASSWARE.

Catalogues sent upon application.



THOMAS M. GRIFFITH,

Civil and Mechanical Engineer.

Having made the construction of Suspension Bridges a specialty, and having built some of the best (cost considered) in the country, respectfully solicits further patronage.

Plans, Calculations and Estimates for the Transmission of Power to Long Distances, and of Wire Rope Tramways and Wire Rope Ferries.

Consulting Engineer of the NEW YORK WIRE AND WIRE ROPE CO., OFFICE, 21 ASTOR HOUSE, N. Y.

The Standard Index and Register Company

Manufacture the only

INSTRUMENT FOR REGISTERING HORSE-CAR FARES

PERMANENTLY ON A PAPER DIAL,

Office, 138 FULTON STREET, NEW YORK.

F. W. Devoe & Co.,

Manufacturers of Fine

RAILWAY VARNISHES,

COACH AND CAR COLORS,

Ground in Oil and Japan,

ETC., ETC.

Fine Brushes adapted for railroad use. All kinds of Artists' Materials. Colors for ready use, and all specialties for Railroad and Carriage purposes.

Railroad companies will save themselves great trouble in painting by allowing F. W. DEVOE & Co. to prepare their Passenger and Freight Car Colors. This will insure Durability, Uniformity and Economy. F. W. DEVOE & Co. manufacture from the crude materials which are the component parts of any shade, and they understand better their chemical relationship, when in combination, than can be possible to those who simply buy their dry materials and then grind them.

SEND FOR SAMPLE CARD OF TINTS.

Cor. Fulton and William Streets,

NEW YORK.

THE SECURITY REIN HOLDER,

PREVENTS ACCIDENT.

Patented March 7, 1882.

Hundreds of accidents occur annually from loose reins. When thrown over the dash or twisted around the whip, they are often switched off into the dirt, or the horse gets his tail over them, causing him to rear, or back, and often run away. All this avoided by using the

"SECURITY REIN HOLDER."

Holds the reins securely in position to be grasped instantly, with a firm hold on the horse's mouth if he be impatient or frightened.

Parties purchasing carriages can have the Rein Holder attached, without extra charge, by asking for it; or they can be attached to carriages in use, in two minutes, by any person.

Sent by mail on receipt of price: $1 for Japan; $1.25 Rubber finish; $1.50 Nickel; $2 Gold plated.

Judson L. Thomson, Manufacturer,

83 and 85 Clinton St., SYRACUSE, N. Y.

ESTABLISHED 1854.

DICKERSON, VAN DUSEN & CO.,

TINS, METALS, ETC.,

29 and 31 CLIFF ST., (P. O. address, Box 1555,)

DICKERSON & Co., Dale St., Liverpool. New York.

ENGINEERS, Mechanics, Mill Owners, Builders, Manufacturers, Miners, Merchants, etc., will find in MOORE'S UNIVERSAL ASSISTANT AND COMPLETE MECHANIC, a work containing 1,016 pages, 500 Engravings, 461 Tables, and over 1,000,000 Industrial Facts, Calculations, Processes, Secrets, Rules, etc., of rare utility in 200 Trades. A $5 book free by mail for $2.50, worth its weight in gold to any Mechanic, Farmer or Business Man. *Agents Wanted.* Sure sale everywhere for all time. For Illustrated Contents Pamphlet, terms, and Catalogue of **500** Practical Books, address NATIONAL BOOK COMPANY, 73 Beekman Street, New York.

WESTERN ELECTRIC COMPANY,

CHICAGO,—NEW YORK,—INDIANAPOLIS,

Telegraph and Telephone Apparatus

AND SUPPLIES.

The Best Quality at Bottom Prices.

Catalogues free on Application.

PATENT DRILL BRACE.

This is one of our regular ten-inch Sweep Ratchet Bit Braces, to which a gear-wheel is added, making it serve the purpose of a Breast Drill. This wheel has cut gears and an extension handle. It is speeded about four to one, and can be removed in one second when not needed for drilling.

The Bit Brace is made of steel, highly polished and heavily nickel-plated, with a cocobola handle and lignum-vitæ head. It has two sets of forged steel jaws, which will hold square and flat shank tools of all shapes and sizes, and round twist drills from 7-16 to 1-32 inch in diameter. The ratchet attachment enables the Brace to be used in places where there is not room to revolve the sweep.

Many attempts have been made to imitate the outside appearance of our Barber Improved Braces, but no one dares to use our Patent Jaws, as seen in this cut, and no brace is good without them. We guarantee these tools to be perfect in every respect, and that they will give great satisfaction to all who use them. Hardware dealers will furnish them on demand at our prices, or we will forward one by express on receipt of Three Dollars.

MILLERS FALLS CO., 74 Chambers St., New-York.

C. T. Raynolds & Co.

(Established in 1770.)

106 & 108 Fulton st., NEW YORK, 21 Lake st., CHICAGO,

COLOR MAKERS,

MANUFACTURERS OF

Fine Coach, Car and Railway Varnishes,
Carmines, Lakes, Vermilions,
White Lead, Zinc, etc.

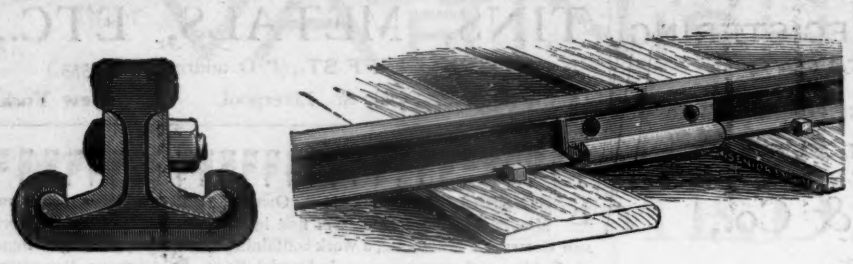
Fine Brushes for Artists, Decorators, Coach, Car, House and Sign Painters,

Artists' Materials, Decorative Tube Colors.

AGENTS FOR

Crockett's Preservative and Genuine Spar Composition.

American Railroad Rail Joint Co.



This is a Suspension Joint, cheap, easily applied, allows for contraction and expansion, prevents the Rail from creeping, battering or brooming at the ends, giving the rail the same strength and elasticity at the Joint as at any other part of the Rail.

The bolts will not elongate or become loose.

Orders and correspondence solicited.

17 Milk Street, Boston, Mass.

NEW-YORK OFFICE, 243 Broadway. G. W. CLARK, AGENT.

BREWSTER & CO. (of Broome-st.)

CARRIAGES AND ROAD WAGONS.

THE LEADING HOUSE IN AMERICA.

Vehicles for Town and Country, for Gentlemen's and Ladies' own driving.

Together with Every Description of Sporting Trap.

Rubber Cushioned Axles used exclusively.

BROADWAY, 47th to 48th Street, N. Y.

(ONLY PLACE OF BUSINESS).

NOTE.—We have no connection with a Stock Company advertising itself as the "Old House."

The Salmon Car Heater.

"36 per cent. of coal saved, and the car kept noticeably warmer!" by using

The Salmon Car Heater.

It insures Safety from Fire in case of accident, Economy in Fuel, and

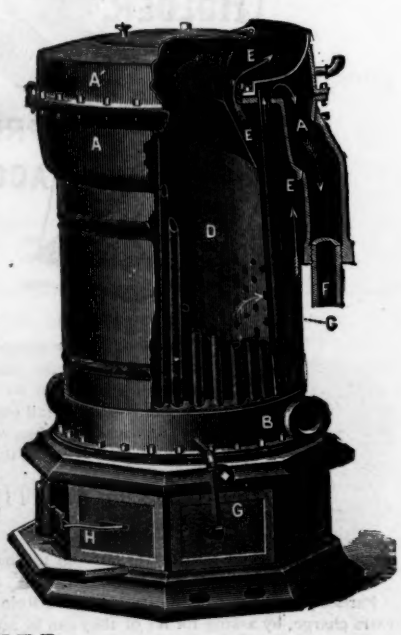
RAPID CIRCULATION.

It heats quickly, is SELF-REGULATING, and can be used for either

STEAM OR HOT WATER.

The Water Tubes do not come in contact with the Coals, but occupy the Smoke Flue in such a manner as to absorb the greatest amount of heat from Coal in a **low state of combustion,** without danger of chilling the fire.

At the last "Mechanics' Fair" it received the Silver Medal, being the highest award to heaters of any kind.



CORRESPONDENCE SOLICITED.

THE SALMON CAR HEATER COMPANY.

OFFICE, 48 CONGRESS STREET, BOSTON, MASS.

GARDNER'S NEW REVERSIBLE CAR SEAT No. 8.

[*Patented Dec.* 6, 1881.]

As the back reverses, it raises the front of the seat so as to prevent the passenger from slipping off the seat, and removes the objection heretofore made to this kind of seat.

The large orders already received from the N. Y. C. and H. R. R. R. and other prominent Companies for our No. 8 Seat, is the best guarantee of its merit.

Made with Perforated Veneer, Leather, Plush, and Rattan Seats, which are interchangeable; one kind of seat can be used in the Summer, and the other in the Winter.

☞ Please send for Descriptive Circular giving full particulars and prices.

GARDNER & CO.,

Patentees and Manufacturers of

Car Seats, Car Ceilings, Depot Seats,

ETC.,

183 Canal St., NEW YORK.

FACTORY: 330 to 342 E. 61st Street.

GET THE BEST.

CHAS. D. THUM,

150 North Third St.,

PHILADELPHIA,

Manufacturer of every description of

Coach, Carriage and Railway

Brushes;

Paint and Sash Tools,

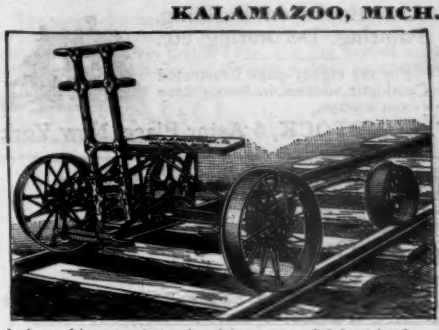
Fitch, Badger & Camel-Hair Varnish (extra thick and strong).

Camel, Ox and Sable Pencils, etc.

The celebrated THUM HALF-ELASTIC VARNISH BRUSH is warranted to stand until it is worn out. It can be used for finishing without being previously worn down; will last longer and carry more varnish than any other brush. Ask your dealer for them, or send for a circular.

Kalamazoo R. R. Velocipede Co.,

KALAMAZOO, MICH.



Carries one or two men; runs backward or forward on straight and level track; no danger in making curves; rate of speed 15 to 20 miles per hour; superior to any one or two-man car in the market; cannot upset, as the operator sits between the rails, thereby avoiding any side draft. Axle revolves under friction rollers. The car is very durable, being of iron and steel, with a powerful foot-brake.

We make Cars for any Gauge Track.

Send for Illustrated Circular.

Licensed under Patents of Sheffield Velocipede Car Co.

PATENT
Practical Shaking Grate Bar.

The W. Ryder Double Acting Grate Bars are so constructed as to rest upon a frame with friction rollers, and by means of a lever attached to the front rocking bar, a reverse or reciprocal motion is produced in each bar, which effectually breaks up the clinkers and removes all the ashes from the bottom of the furnace. By this means we get the largest percentage of circulation of air, which keeps the bars cool and prevents them from burning or warping. There is also fully 10 per cent. of fuel saved, as it does away with the necessity of opening the furnace door and slaking the fire, thus preventing large volumes of cold air rushing in and producing sudden expansions and contractions, frequently blistering the bottom of the boiler. I guarantee that my bars will pay for themselves the first year in the saving of fuel.

Send for descriptive catalogue.

W. RYDER, 134 Water-st., New York.

The Improved Hancock Inspirator for Locomotives.

Send for circulars and full particulars to the

Hancock Inspirator Company,

No. 34 BEACH STREET,

BOSTON, MASS.

Drawing Instruments & Materials,

Also Books on Building, Painting, Decorating, etc.

For my eighty-page Illustrated Catalogue, address, inclosing three 3-cent stamps,

WM. T. COMSTOCK, 6 Astor Place, New York

WILLIAM WALL'S SONS,

MANUFACTURERS OF

CORDAGE,

ITALIAN HEMP PACKING, RUSSIA HEMP PACKING, AMERICAN HEMP PACKING, BELL CORD.

No. 113 Wall Street, NEW YORK.

PATENTS.

The National Scientific Association,

with a Local Attorney in nearly every County in the United States, secures

Patents, Caveats, Trade Marks, etc.

Patent Litigation throughout the United States given special attention. Little Book on Patents free.

CHICAGO OFFICE: 182 and 184 Dearborn St., Room 19 and 20 Howland Block. WASHINGTON OFFICE: Room 31 LeDroit Building.

Waterbury Brass Co.,

No. 296 Broadway, New York.

Sheet, Roll and Platers' Brass.

MILLS AT WATERBURY, CONN.

J. A. DEAN & CO. PERFECTLY PURE LINSEED OIL

J. A. DEAN & CO.,

Manufacturers of

LINSEED OIL and

LINSEED CAKE,

181 Front Street, New York.

Swift's Iron and Steel Works,

No. 26 WEST THIRD STREET,

CINCINNATI, OHIO.

Manufacturers of all Weights of Standard and Narrow Gauge Rails by the most approved process. Also Rail Fastenings, Steel and Bloom Boiler Plate, and Tank, Sheet and Bar Iron.

PHELPS, DODGE & CO.,

IMPORTERS OF

Tin Plate, Sheet Iron, Copper, Block Tin, Wire, etc.,

Cliff Street, between Fulton and John,

NEW YORK.

Established 1842.

Ingersoll Liquid Rubber Paint.

The only Paint unaffected by Moisture, Fumes from Coal, Gas, Sun, Salt Air or Water.

THIS IS RELIABLE.

Ingersoll's Paint Works, 76 Fulton Street,

Cor. Gold Street. NEW YORK.

BRUSHES

For CAR BUILDERS and RAILROAD CO.'S Purposes,

IN EVERY VARIETY.

JOHN G. McMURRAY & CO.,

277 Pearl Street, New York.

OLDEST BRUSH HOUSE IN AMERICA.

"PROGRESSIVE AND RELIABLE."

"Under its present management,

The Erie Railway

has become the most progressive and reliable Trunk Line in America."—CLEVELAND LEADER.

THE ERIE is the SAFE AND COMFORTABLE LINE between the East and West. Its equipment is unsurpassed—PULLMAN COACHES, WESTINGHOUSE AIR BRAKE, MILLER SAFETY PLATFORM, CARS LIGHTED BY GAS, STEEL RAILS, DOUBLE TRACK.

☞ The scenery along the line includes such great works of Nature as NIAGARA FALLS, WATKIN'S GLEN, PORTAGE FALLS and GORGE, the GREAT LAKES, and the LAKES OF CENTRAL AND WESTERN NEW YORK, making it truly the "LANDSCAPE ROUTE OF AMERICA."

E. S. BOWEN, Gen'l Sup't, N. Y.

JNO. N. ABBOTT, Gen'l Pass. Agent, N. Y.

Housatonic Railroad.

THE ONLY LINE RUNNING

THROUGH CARS

Between New-York, Great Barrington, Stockbridge, Lenox and Pittsfield—the far-famed resorts of the

BERKSHIRE HILLS

of Western Massachusetts—"Remarkable for pure air, romantic drives, and grand mountain scenery. Nature has truly expressed herself in wondrous beauty in the scenery of this region, containing perhaps, more of genuine enchantment than any other in New England."

Two through trains daily between New-York City and all points on the Housatonic Railroad, from the Grand Central Depot via the New-York, New-Haven and Hartford Railroad, at 8.09 A. M. and 3.39 P. M.

Descriptive Guide Book sent free by mail upon application to the General Ticket Agent.

H. D. AVERILL, Gen'l Ticket Agent

W. H. YEOMANS, Superintendent.

General Offices, Bridgeport, Conn., Dec. 27, 1882.

New York & New England Railroad

Resumption of the favorite

TRANSFER STEAMER MARYLAND ROUTE.

Through Pullman Cars for

PHILADELPHIA, BALTIMORE AND WASHINGTON,

WITHOUT CHANGE; connecting with through trains to FLORIDA and all points SOUTH and WEST. Trains leave Boston at 6.30 P. M., daily.

Leave Boston for GRAND CENTRAL DEPOT, NEW YORK, at 9 A. M.; returning, leave New York at 11 A. M. and 11.34 P. M., week days. Pullman Palace Cars run through.

THE NORWICH LINE between BOSTON and NEW YORK

Steamboat train leaves Boston 6.30 P. M., arrives at New London at 10.00 P. M., connecting with the new steamer CITY OF WORCESTER, Mondays, Wednesdays and Fridays, and CITY OF NEW YORK, Tuesdays, Thursdays and Saturdays. Returning, steamer leaves Pier 40, North River, New York, at 4.30 P. M., connecting at New London with train leaving at 4.05 A. M., arriving in Boston at 7.55 A. M. Good night's rest on the boat.

ASK FOR TICKETS VIA N. Y. AND N. E. R. R.

Office, 322 Washington street, Depot foot of Summer street, Boston.

S. M. FELTON, Gen'l Manager. A. C. KENDALL, Gen'l Pass. Agent

No other Line is Superior to the

Fitchburg Railroad

Hoosac Tunnel Route

WEST.

8.30 A. M. DAY EXPRESS.

Wagner Palace Drawing-Room Cars Attached.

Running through to Syracuse, N. Y., where connection is made with through sleeping-cars for Cincinnati, Cleveland, Toledo, DETROIT and CHICAGO.

3.00 P. M. CINCINNATI EXPRESS.

Pullman sleeping-car attached, running through to Cincinnati without change. (Only line running Pullman Cars from Boston.) This car runs via Erie Railway and N. Y., P. & O. R. R., making direct connection for Louisville, St. Louis, Kansas City, New Orleans and all points in Texas and New Mexico.

3.00 P. M. ST. LOUIS EXPRESS.

THE ONLY LINE which runs a THROUGH SLEEPING-CAR from

Boston to St. Louis without change!

Arriving at 8.00 A. M. Second Morning.

Through sleeping-car for Buffalo, Toledo, Fort Wayne, Logansport, Lafayette, Danville, Tolono, Decatur and St. Louis, making direct connection with through Express Trains for Kansas, Colorado, Texas, and all points in the

SOUTHWEST.

6.00 P. M. PACIFIC EXPRESS.

The only line running a through sleeping-car via Niagara Falls, Canada Southern Railway and Detroit without change, arriving at Chicago at 8 A. M., second morning, making sure connections with through Express Trains for Iowa, Nebraska, Kansas, Colorado, the Pacific Coast, Wisconsin, Minnesota, and all points in the

WEST AND NORTHWEST.

The above Trains run daily, Sundays excepted.

This Great Short Line passes through the most celebrated scenery in the country, including the famous HOOSAC TUNNEL, four and three-quarter miles long, being the longest tunnel in America and the third longest in the world.

Tickets, Drawing-room and Sleeping-car accommodations, may be secured in advance by applying to or addressing

250 Washington St., Boston. 250

JOHN ADAMS, Gen'l Sup't. J. WHITMORE, Traffic Manager.

J. R. WATSON, Gen'l Pass. Agent.

SHORT LINE.

The use of the term "Short Line" in connection with the corporate name of a great road, conveys an idea of just what is required by the traveling public—a Short line, Quick Time, and the best of accommodations—all of which are furnished by the greatest railway in America,

CHICAGO, MILWAUKEE AND ST. PAUL.

It owns and operates over 4,500 miles of road in Northern Illinois, Wisconsin, Minnesota, Iowa and Dakota; and as its main lines, branches and connections reach all the great business centers of the Northwest and Far West, it naturally answers the description of Short Line and Best Route between

CHICAGO, MILWAUKEE, ST. PAUL AND MINNEAPOLIS.
CHICAGO, MILWAUKEE, LA CROSSE AND WINONA.
CHICAGO, MILWAUKEE, ABERDEEN AND ELLENDALE.
CHICAGO, MILWAUKEE, EAU CLAIR AND STILLWATER.
CHICAGO, MILWAUKEE, WAUSAU AND MERRILL.
CHICAGO, MILWAUKEE, BEAVER DAM AND OSHKOSH.
CHICAGO, MILWAUKEE WAUKESHA AND OCONOMOWOC.
CHICAGO, MILWAUKEE, MADISON and PRAIRIE DU CHIEN.
CHICAGO, MILWAUKEE, OWATONNA AND FARIBAULT.
CHICAGO, BELOIT, JANESVILLE AND MINERAL POINT.
CHICAGO, ELGIN, ROCKFORD AND DUBUQUE.
CHICAGO, CLINTON, ROCK ISLAND AND CEDAR RAPIDS.
CHICAGO, COUNCIL BLUFFS AND OMAHA.
CHICAGO, SIOUX CITY, SIOUX FALLS AND YANKTON.
CHICAGO, MILWAUKEE, MITCHELL AND CHAMBERLAIN.
ROCK ISLAND DUBUQUE, ST. PAUL AND MINNEAPOLIS.
DAVENPORT, CALMAR, ST. PAUL AND MINNEAPOLIS.

PULLMAN SLEEPERS and the FINEST DINING CARS IN THE WORLD are run on the main lines of the *CHICAGO, MILWAUKEE AND ST. PAUL RAILWAY*, and every attention is paid to passengers by courteous employes of the Company.

S. S. MERRILL, Gen'l Manager. A. V. H. CARPENTER, Gen'l Pass. Agent.
J. T. CLARK, Gen'l Sup't. GEO. H. HEAFFORD, Ass't Gen'l Pass. Agent.

Prominent Locomotive and Car Builders.

Adrian Car Works, Adrian, Mich.
W. C. Allison, Junction Car Works and Flue Mill, Philadelphia, Pa.
Altoona Car Works, Altoona, Pa.
Atlanta Machine Works, Atlanta, Ga.
Baldwin Locomotive Works: Burnham, Perry, Williams & Co., Phila., Pa.
Barney & Smith Manufacturing Co., Dayton, Ohio.
Beaver Falls Car Co., Beaver Falls, Pa.
Osgood Bradley, Worcester, Mass.
J. G. Brill & Co., Philadelphia, Pa.
Brooks Locomotive Works, Dunkirk, N. Y.
Brownell & Wight Car Co., St. Louis, Mo.
M. M. Buck & Co., St. Louis, Mo.
Erie Car Works, Erie, Pa.
Gilbert & Bush Co., Troy, N. Y.
Harlan & Hollingsworth Co., Wilmington, Del.
Haskell & Barker Car Co., Michigan City, Mich.
Hazelton Car Works, Hazelton, Pa.
Indianapolis Car and Manufacturing Co., Indianapolis, Ind.
Jackson & Sharp Company, Wilmington, Del.
Jones Car Manufacturing Co., Schenectady, N. Y.
Keith Manufacturing Co., West Sandwich, Mass.
Kingston Car Works Co., Kingston, Canada.
Laconia Car Co., Laconia, N. H.
Lima Car Co., Lima, Ohio.
Wm. Mason & Co., Taunton, Mass.
Mansfield Machine Works, Mansfield, Ohio.
Muskegon Car and Engine Works, Muskegon, Mich.
Ohio Falls Car Co., Jefferson, Ind.
Pardee Car Works, Watsontown, Penn.
Portland Locomotive Works, Portland, Maine.
Pullman Car Co., Pullman, Ill.
Rogers Locomotive and Machine Works, Paterson, N. J.
Schenectady Locomotive Works, Schenectady, N. Y.
The John Stephenson Co. (Lim.), New York City.
Taunton Locomotive Works, Taunton, Mass.

BROWN BROTHERS & Co.,

59 Wall Street, New York,

BUY AND SELL

BILLS OF EXCHANGE,

ON GREAT BRITAIN, IRELAND, FRANCE, GERMANY, BELGIUM AND HOLLAND.

Issue Commercial and Travelers' Credit in Sterling.

AVAILABLE IN ANY PART OF THE WORLD, AND IN FRANCS IN MARTINIQUE AND GUADALOUPE.

Make TELEGRAPHIC TRANSFERS OF MONEY between this and other countries, through London and Paris.

Make Collection of Drafts drawn abroad on all points in the United States and Canada, and of Drafts drawn in the United States on Foreign Countries.

ESTERBROOK'S STEEL PENS.

Leading Numbers: 14, 048, 130, 333, 161.

FOR SALE BY ALL STATIONERS.

THE ESTERBROOK STEEL PEN CO.,

Works, Camden, N. J. *26 John St., New York.*

WARE BROS.,
ENGRAVERS ON WOOD

Mechanical Drawing and Engraving a Specialty.

We rely upon our own artists. All drawings, after being placed on the blocks, are submitted for approval. Special figures given for all complicated machinery, and for large orders. We hope for a portion of trade from the houses advertising in and reading this Journal. Allow us to give figures at least.

WARE BROS.,

Lock Box 2769. **9th and Walnut Sts., Phila., Pa.**

THE ROGERS

Locomotive and Machine Works,

PATERSON, N. J.

Having extensive facilities, we are now prepared to furnish promptly, of the best and most approved descriptions, either

COAL OR WOOD BURNING

LOCOMOTIVE ENGINES,

AND OTHER VARIETIES OF

RAILROAD MACHINERY.

J. S. ROGERS, PRESIDENT.
R. S. HUGHES, SECRETARY.
WM. S. HUDSON, SUPERINTENDENT. } Paterson, N. J.

R. S. HUGHES, TREASURER,
44 Exchange Place, N. Y.

JNO. R. GILES, Sec'y and Treas.

Burrow-Giles Litho. Co.,

Cor. Grand and Baxter Streets,

NEW YORK.

We have every facility for the production of first-class work in

Show Cards, Labels, Leaflets, Pamphlets, Excursion-book Covers,

AND EVERY VARIETY OF PLAIN AND COLORED WORK.

Specialties in Flock and Embossed Work, and Railroad Work in general.

Estimates and Designs furnished on application.

REMINGTON Standard Type Writer.

Adopted in the offices of the principal Railroad and Supply Companies.

SIMPLE, DURABLE, NEAT.

Operated at *sight;* writes FASTER and BETTER than the most expert penman.

THOUSANDS OF TESTIMONIALS.

☞ SOLD UNDER ABSOLUTE GUARANTEE. ORDER WITH THE PRIVILEGE OF RETURNING IF NOT SUITED.

WYCKOFF, SEAMANS & BENEDICT,

281 AND 283 BROADWAY, N. Y.

38 East Madison Street, Chicago. 715 Chestnut St., Philadelphia.
Washington St. (cor. Water St.), Boston. LeDroit Building, Washington.

J. H. HOLLMANN,

DEALER IN

RAILROAD TIES,

Car and Railroad Lumber,

WHITE AND YELLOW PINE AND OAK,

MILLS BUILDING,

ROOM 14, 35 WALL STREET

E. W. VANDERBILT. E. M. HOPKINS.

VANDERBILT & HOPKINS,

Railroad Ties,

CAR AND RAILROAD LUMBER.

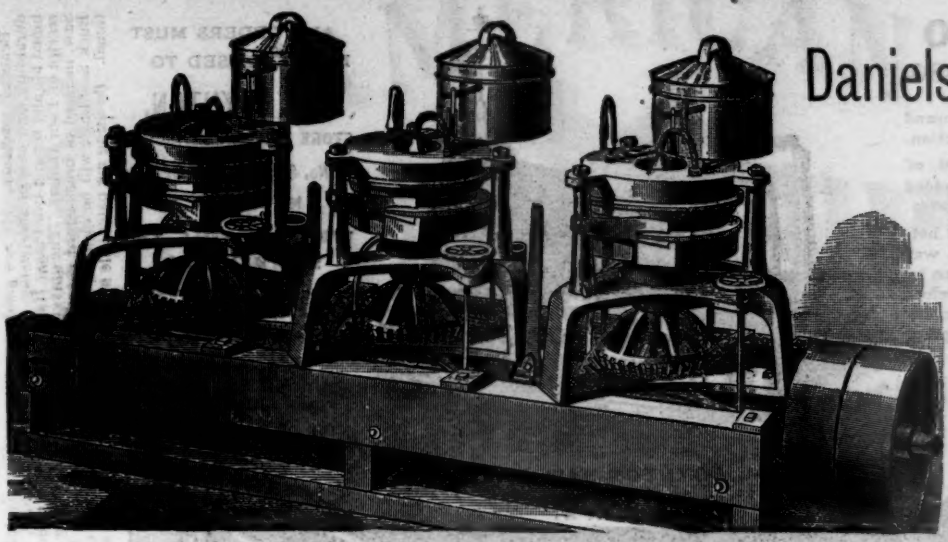
White and Yellow Pine, Oak, Gum and Cypress Cut to Order.

120 Liberty Street,

NEW YORK.

Creosoted and Treated Lumber and Ties, Pine Boards, Plank and Dimension Lumber to Order.

General Railroad Supplies.



THE

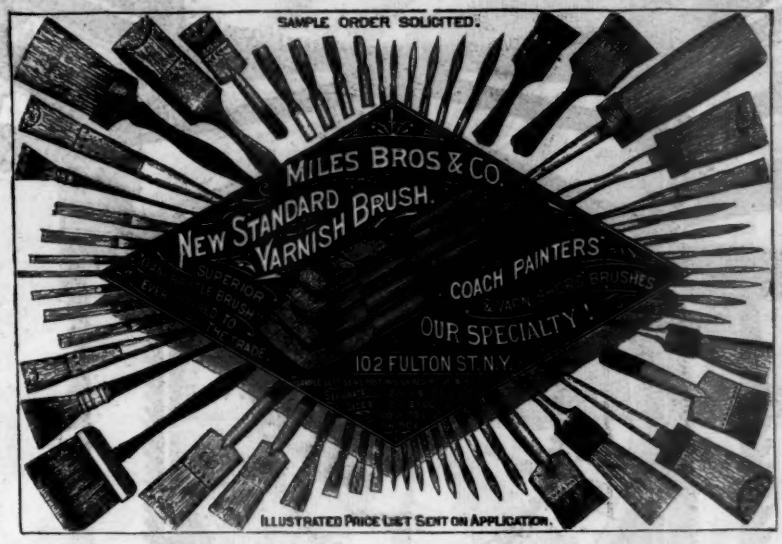
Daniels Paint Mills.

The cut represents three mills on one bench, all driven by one belt; the stones are cooled with water expressly for grinding Coach Colors in Japan and Varnishes. The larger sizes are especially adapted for grinding car and all fine oil colors.

These Mills are now in use by nearly all the large manufacturers in the United States and Canada.

I also build a variety of Mills for the more common paints both dry and in oil. These common Mills are without the cooling appliances.

WILLIAM DANIELS,
Patentee and Sole Manufacturer,
55 Atlantic Avenue,
BROOKLYN, N. Y.



Established in 1836.

Lobdell Car Wheel Company,

WILMINGTON, DELAWARE.

GEORGE G. LOBDELL, PRESIDENT.
WILLIAM W. LOBDELL, SECRETARY.
P. N. BRENNAN, TREASURER.

W. R. SANDERS,

NEGOTIATOR AND PROMOTER.

Railroads and Timber Lands Special.

New Bonds Placed. English Connections. Correspondence Solicited

202 BROADWAY, N. Y.

IMPROVED

Sheet Iron Roofing.

Best Quality and Simplest Plan in use.

MANUFACTURED BY

T. C. SNYDER & Co., Canton, O.

Cheaper, stronger and less liable to get out of repair than tin. Any mechanic can apply it. Sample Circular and Price List free by mail at request. Also,

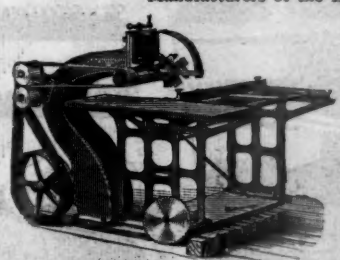
AGENTS FOR LOWE'S METALLIC PAINT.

MANUFACTURERS OF

Pentz Patent Rein Holders, and Davis's Rock Drill Machines

C. B. ROGERS & CO.,

Manufacturers of the Latest Improved



Wood-Working Machinery

For Car Builders, Planing Mills, Cabinet, Carriage and Railroad Shops, House Builders, Sash, Door and Blind Makers.

Warerooms: 109 Liberty St., New York.

Factory: NORWICH, CONN.

The E. M. Boynton Saw and File Company, Manufacturers of all kinds of **Saws, Saw-sets, Patent Cross-cut Handles, Tools and Files,**

Factories: 36, 38, 40 and 42 Devoe Street, Brooklyn. Office: 80 BEEKMAN STREET, NEW-YORK.

500,000
SOLD IN 1880.

Not one in a thousand failed to give satisfaction.

The First Award of Australia has been added to the Centennial Awards.

The 12-inch log at bottom of this picture was sawed off by two men by hand in 7 seconds before Commissioners of every country and the Emperor of Brazil.

THE E. M. BOYNTON SAW & FILE CO.
34, 36, 38, 40 & 42 DEVOE ST.
BROOKLYN.

ALL ORDERS MUST BE ADDRESSED TO

E. M. BOYNTON,
STORE AND WAREHOUSE,
No. 80 BEEKMAN ST.,
N. Y. CITY,

WHERE A FULL ASSORTMENT OF

SAWS, FILES, AND TOOLS,
ARE KEPT.

Beats all machines. My new goods are guaranteed unrivaled in speed, durability, and ease of sharpening. A six-foot Cross-Cut Saw, with combined file and set and two Patent Handles, will be sent to any address upon receipt of Four Dollars. The universal Pat. sheathed, Pruning and Hand Saw, inclosed in brass-edged sheath, mailed on receipt of One Dollar. A Buck Saw blade will be inclosed with the Cross-Cut for fifty cents additional. By using my patent file a Cross-Cut may be sharpened at a cost of five cents, and a Buck Saw for five cents. Send for illustrated price list. I make a liberal discount to honest dealers, and will protect them. I have obtained decree, with costs and damages, against all parties who imitate my **M** teeth which cut with the outside of the **M** only. The two points of each tooth are set upon one side and the next two points on the other side, equivalent to front cut of ordinary hand-saw tooth, both ways, one point alternate decreases cutting one-half, as do all imitations (which are still held liable by the United States Court), and new Company will now collect of dealers and users, as well as manufacturers, for infringements. An Illustrated Catalogue furnished free on application.

For One Dollar, a Pruning Saw, complete, with brass edge sheath, or a Buck Saw blade, will be mailed. Agents wanted, to whom special terms will be made, and who can do well. This Company also manufactures the **Noon-day Stove Polish,** so rapidly coming into favor.